

## Climate Health WA Inquiry

### About your submission

Are you responding on behalf of an organisation or group?

- No  
 Yes

If yes, please identify the organisation: Edith Cowan University

### Your contact details

The following information will not be published without your permission but enables the Inquiry to contact you about your submission if required.

First name	[REDACTED]
Surname	[REDACTED]
Address	[REDACTED]
Phone	[REDACTED]
Email	[REDACTED]

### Publication of submissions

Submissions will be published with the name of the submitter unless otherwise indicated below. Do you consent to be identified in the published submission?

- Yes, I / my organisation agree to be identified  
 No, I / my organisation request to remain anonymous

### Terms of Reference

You are encouraged to address at least ONE of the Terms of Reference as listed below. Please select which item/s you will address:

1. Establish current knowledge on the implications of climate change for health in Western Australia (WA) and recommend a framework for evaluating future implications.
2. Identify and recommend a program of work to manage the implications of climate change for health in WA, which will protect the public from the harmful health impacts of climate change.
3. Identify and recommend a program of work to manage the implications of climate change for health in WA, which will strengthen the preparedness and resilience of communities and health services against extreme weather events, with a focus on the

most vulnerable in the community.

4. Identify and recommend a program of work to manage the implications of climate change for health in WA, which will reduce the contribution of WA health services to climate change and other detrimental impacts.

5. Identify and recommend a program of work to manage the implications of climate change for health in WA, which will enable WA Health services to implement change, including energy efficiency, to a more sustainable model.

6. Evaluate the likely benefits (health and wellbeing, social and economic) arising from climate change mitigation strategies, with a focus on WA health services.

7. Define the role of the Department of Health in leading public policy on climate change and health.

8. Recommend the Terms of Reference, scope and preferred methods for undertaking a climate change vulnerability assessment for the health sector.

9. Recommend the Terms of Reference, scope and preferred methods for developing a Climate Change Adaptation Plan for the health sector.

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

#### Executive Summary

This submission from Edith Cowan University was developed with input from more than 25 ECU academics engaged in teaching and research regarding health and climate change. The submission includes an analysis of critical climate justice issues in the WA context, exemplars of ECU research and action, and recommendations for the WA Department of Health and State Government more broadly. ECU contributors to this submission include Dr Naomi Godden; Doreen Wijekoon Bandara; Prof Amanda Devine; Prof Pierre Horwitz; Ros Sambell; Dr Susan Bailey; Dr Marilyn Palmer; Dr Stephanie Godrich; Prof Kathy Boxall; Ana Gowrea; Prof Jacques Oosthuizen; Dr. Lauren Bloomfield; Dr Joseph Scott; Dr Donna Barwood; Associate Professor Andrew Jones; Dr Leslie Calapre; Prof Mel Ziman; Dr Angela Genoni; Kerry Staples; Anne Polley; Ruth Wallace; Margaret Miller; Lesley Andrew; Dr Lauren Blekkenhorst; Dr Josh Lewis; Dr Marc Sim.

#### *Climate justice*

There is comprehensive evidence from Australian research that people who already experience disadvantage and marginalisation are most vulnerable to the health impacts of climate change, and these experiences are differentiated. Some of these groups include (but are not limited to) First Nations peoples, women, children and young people, elderly people, people with a disability, people of colour, LGBTI+ people, people on a low income, and people living in rural and remote communities (see, for example, Alston 2011; Alston and Whittenbury 2013; Arabena and Kingsley 2015; Bell and Blahski 2014; Choy *et al.* 2013; Gorman-Murray *et al.* 2017; Hansen *et al.* 2013; Hughes *et al.* 2016; Parkinson *et al.* 2015; Sevoyan *et al.* 2013). It is

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

likely that other vulnerable groups will emerge in WA as the climate crisis intensifies. Some identified health issues of climate injustice in this submission include food insecurity, gendered inequalities, domestic violence, ecological grief, heat stress, increased disease risk, and skin cancer. In particular, we highlight that climate change affects the food system and people's health. Food security is going to be one of the most pressing climate-related issues, as food becomes increasingly scarce and expensive.

#### *Social and ecological determinants of health*

As communities across the globe grapple with the slow-onset disaster of climate change, there is a mounting call for any and all responses to be undertaken from a perspective of ecojustice (Ife, 2016; Pedersen, 1998; Shiva, 2005). This is because there are social *and* ecological determinants of health (Horwitz et al. 2017). The response to the climate emergency requires a paradigm shift and transition to a new system that is grounded in the rights of people and the rights of nature. Climate change provides an opportunity for Western Australia to undertake a major paradigm shift in its social, political, cultural, economic and environmental orientation as a response to the well documented threats posed by a warming planet. A Limits to Growth framework (Meadows 1997) can assist the WA government to undertake this transformation.

#### *Health of First Nations peoples under climate change*

We highlight significant concerns about the impact of climate change on the health of First Nations peoples in Western Australia. First Nations peoples have 'higher than average exposure to climate change because of a heavy reliance on climate-sensitive primary industries and strong social connections to the natural environment, and face particular constraints to adaptation' (IPCC 2014, p. 1375). It is documented that in Australia, First Nations peoples have unique experiences of climate change due to their spiritual relationships with land (*country*) (Green and Minchin 2014, Arabena and Kingsley 2015, Hughes *et al.* 2016, Zander *et al.* 2013), and these experiences are explained further in this submission.

#### *Edith Cowan University's contribution to climate and health*

ECU's teaching, research and community leadership contributes to climate change mitigation and adaptation and addressing the health impacts of climate change in Western Australia. ECU's work covers multiple and intersecting areas including transformation of the WA food system; the social justice impacts of climate change; ecojustice; food security; regenerative agriculture; gender and climate change; ecological grief; heat stress; communicable disease outbreaks; skin cancer; co-design of local solutions; food education; Healthy Active by Design; modelling climate risks; ecohealth; and eco-social work. Our work also involves the development of community programs and networks to enhance climate resilience in WA.

#### *WA Health system and climate change*

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

The WA health system is a significant contributor to greenhouse gas emissions, and therefore must take a lead role in mitigating climate change through emissions reductions. Furthermore, the WA Department of Health, as the largest public sector bureaucracy in WA, with already well-established links to other relevant government and private agencies has the capacity to act as a lead agent responding to the slow onset disaster of climate change. This submission outlines numerous opportunities for a whole-of-government approach led by the the Department of Health for the prevention and mitigation of, and adaption to, climate change.

#### *Key recommendations*

- That the WA Government, Department of Health and WA health sector declares a climate emergency and commits to achieving net zero emissions by 2030. (ToR 7)
- That the Department of Health be obliged through legislation to provide a broad and detailed analysis of the health outcomes for any new coal, gas or oil extraction projects, and for the expansion of existing coal, gas or oil projects (ToR 7)
- That the WA Department of Health assumes a visible, transformational leadership position in articulating the relationship between health and the climate crisis and the need for emissions reduction, and in transitioning the WA Government and communities to ambitious policies and actions to address the climate emergency. (ToR 7)
- That the WA health sector (public, private and community) collaboratively develops an action plan to transition to net zero greenhouse gas emissions by 2030, and that resources are provided by the WA Department of Health to achieve this goal. The plan can include actions such as the installation and use of carbon-free energy, the use of carbon-free transport, waste reduction and management, carbon-offsetting, sourcing low-emissions food, planting trees and enhancing bushland, healthy food environments and role modelling and educating staff and community. This should be supported by a regulatory framework with high targets and a monitoring strategy with levels of accountability and defined timelines to ensure actions are achieved in a timely manner. (ToR 2, 3 and 4)
- That climate justice is integrated and mainstreamed through all areas of work in the WA health system (including services, policies, programs, job descriptions, KPIs, funding, research and facilities) to prevent the harmful health impacts of climate change and support communities to adapt to climate change, ensuring that no one is left behind. (ToR 7)
- That climate health responses are place-based and respond to the differentiated experiences and issues of vulnerable groups that builds on existing work from ECU. (ToR 3 and 7)
- That people who are most affected by climate change are included in co-design

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

and decision-making regarding climate health programs and policies that builds on existing work from ECU . (ToR 3 and 7)

#### 1. Climate emergency and health requires a whole of government approach

##### Background

The extensive works of the United Nations Intergovernmental Panel on Climate Change (IPCC) show that local communities, WA, Australia and our world are in a Climate Emergency, with severe and significant impacts on the health of people and the environment. In the 2015 Paris Climate Agreement, every country including Australia committed to limiting global warming to less than 2°C above pre-industrial levels by 2100. However, United Nations Environment (2018) calculates that current international targets to reduce carbon emissions are seriously inadequate, and Earth is on track for 2.9-3.4°C of warming by 2100. As of 22 August 2019, a Climate Emergency has been declared by 965 governments around the globe covering a population of 212,197,008 people, including the United Kingdom, and WA local governments of City of Fremantle, Town of Victoria Park, Vincent City Council and City of Bunbury. The Climate Emergency is also recognised by the Australian Local Government Association and WA Local Government Association. In June 2019, the Newcastle Foundation Trust was the first UK health service to declare a climate emergency, and pledged to become carbon neutral by 2040.

The evidence is overwhelming that urgent, systemic action must be taken by all levels of government to significantly reduce greenhouse gas emissions in order to limit global warming to 1.5°C above pre-industrial levels, with a conservative recommendation of 50% reduction of global GHG emissions by 2030 and achieving net zero emissions by 2050 (IPCC 2018). The Australian Climate Council's scientific analysis shows that Australia must reduce its emissions by 65% by 2030 to limit global warming to 1.5 degrees, while others argue that high-emitting and fossil fuel exporting developed countries such as Australia must attain net zero emissions by 2030 for Earth to realistically limit warming to 1.5 degrees. Under a scenario of 2° of warming, risks for natural and human systems include higher species loss and extinction; increased damage to ecosystems and loss of productivity in associated industries; increased frequency and magnitude of floods, droughts, heatwaves and bushfires; greater risks of water scarcity and reduced food availability; and higher likelihood of health issues, poverty and disadvantage (IPCC 2018).

##### Western Australian focus

Some of the predicted impacts of climate change in WA includes risk of bushfire and drought, less fresh water and average rainfall, bigger risk to coastal settlements due to coastal erosion and flooding, increased heat stress-related deaths and diseases particularly among the elderly, reduction of agricultural production bearing a cost on food and water along with varying population distribution in regional areas, impact on tourism, threat to aquatic biodiversity and an increased need to accelerate infrastructure development such as water supply sources (Department of

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

Environment Conservation, 2012). At particular risk is South Western Australia, which is one of 36 global biodiversity hotspots with 'extraordinary endemic Gondwanan biota and large-scale landscape transformation' (Wardell-Johnson et al. 2016, p.806.).

#### Prevention, adaptation, and transitioning the system as solutions

There are limits to adaptation to climate change, and therefore preventing climate change must be the key focus of the WA government and health sector in response to this Inquiry. This includes an urgent, whole-of-system transition to carbon-free energy and transport across all sectors (including health), no new coal, gas or oil extraction projects nor expansion of existing projects, and urgent transition to regenerative agricultural practices.

Unfortunately, there is a significant disconnect between the goals and intent of global agreements (such as the Paris Agreement and Sustainable Development Goals), and national and WA priorities and deliverables. Analysis by Climate Analytics (Yanguas Parra et al. 2019) found that 'if current government and industry projections for fossil fuel exports are realised, Australia could be responsible (including both domestic and exported emissions) for about 13% (between 11.9% - 17.4%) of Paris Agreement compatible global CO2 emissions in 2030' (p.2). The carbon footprint of WA's total gas reserves alone is equivalent to 4.7% - 6.4% of the global energy system carbon budget under the Paris Agreement; six times greater than Australia's Paris Agreement energy sector budget (Hare et al. 2018). Australia's National Greenhouse Gas Inventory (Department of the Environment and Energy) shows that in 2017, WA produced 16.3% of Australia's GHG emissions, despite only having 10.4% of the national population. Notably, almost 95% of WA's domestic emissions were from energy production. There is growing community demand to reduce the extraction and burning of fossil fuels in WA, and the science clearly shows that urgent action is necessary to stave off catastrophic climate change. We note that the WA Government has recently announced a goal of net zero greenhouse gas emissions by 2050 and that proponents of major new projects or project expansions that emit significant emissions will need to develop greenhouse gas management plans that details their contribution towards achieving the State's emissions reduction goals.

The 'Limits to Growth' framework identifies that human activities are constrained by planetary limits, and acknowledges that under neoliberal capitalism, it is difficult to effectively and fairly tackle the climate crisis. Capitalist societies are locked into an economic system which is premised on exponential growth in consumption and throughput of goods and services (Meadows, Meadows, Randers, & Behrens, 1972). This rising throughput increases atmospheric and ocean carbon as a result of burning fossil fuels to acquire energy for transport; the production of infrastructure and goods; deforestation; and, animal farming. When the Earth's capacity to absorb this carbon is exceeded, we change the climate and increase a range of hazards which will have an adverse impact on communities (Atkisson, 2011). One way to slow down carbon production is to slow down extraction, consumption and

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

throughput, inevitably triggering economic downturn in countries with economic systems premised on exponential growth, like Western Australia. This has consequences for income generation, employment and working conditions as the owners of capital seek to minimise their losses and prolong their 'business-as-usual' approach to production by denying or minimising the link between throughput and climate change. As such, this transition needs to be carefully managed and supported by innovative job creation and solutions by industry, government and the tertiary sector as a phased approach, which has been evidenced in other countries.

Furthermore, current Australian diets and food systems contribute to global warming and environmental degradation leading to climate change, oil, water and nutrient scarcity, land degradation, food insecurity, food waste and biodiversity loss. Food production (including food transport) is a large contributor to climate change. The current food systems contribute to environmental degradation and inequitable food distribution, overconsumption of foods in general (especially energy-dense nutrient-poor foods) and food waste. In contrast, diets that are consistent with recommendations for good health (i.e. encourage plant foods, limit animal foods and energy dense, nutrient poor foods and recommend energy balance) are also likely to have lower environmental impact and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, safe and healthy, while optimizing natural and human resources. (See Inquiry submission from Ana Gowrea). Regenerative or sustainable agriculture is underway in parts of Western Australia and is one solution in the food system transformation that is needed. This concept is gaining traction with WA State government. ECU is already engaging with Natural Resource Management agencies in the State and scoping work with local government to advance this agro-ecological principle (See Inquiry submission from Ros Sambell and Prof Amanda Devine).

*Prioritising social, political, cultural, economic and environment issues requires courage and strong leadership*

The dominant Western, neoliberal, hyper-capitalist, industrial, militaristic, patriarchal structure which currently underpins our social and economic system is not just or sustainable and will need to change. The original authors of the work on *Limits to Growth* explain in detail why a change in paradigm is both necessary and inevitable for a sustainable society (Meadows, 1997).

The systemic transition to an alternative paradigm of justice for people and planet requires transformational, collaborative leadership. Currently, the Western Australian government has a climate leadership culture of uncertainty, with politicised delays for urgent action and a 'she'll be right' attitude that places the responsibility of climate change mitigation on 'someone else's agenda'. Concerningly, community demands to reduce the burning of fossil fuels can provoke simplistic solutions such as mining and processing uranium for nuclear power. Rising sea levels and threats to food and water security as a result of climate change may result in global tensions leading to the testing and use of nuclear weapons. Both of these scenarios threaten the genetic endowment of humans exposed to toxic substances. Australian

## Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

government's global commitment to the Sustainable Development Goals (SDGs) has been in part devolved to state and local governments for further action. This mechanism provides an opportunity for ongoing monitoring and reporting in response to policy and practice implementation relating to all 17 SDG. The latest SDG report for 2019 (Sachs et al. 2019) confirms Australia's need to strengthen policy for climate action.

We strongly hope that the outcomes of this inquiry, and the forthcoming WA Climate Policy, demonstrate long-term governmental vision. The WA government will need to demonstrate the strongest level of leadership and confidence to transform the system in a way that will support the health of all people and the planet going forward.

*1.1 Recommendation: That the WA Government, Department of Health and WA health sector declares a climate emergency and commits to achieving net zero emissions by 2030. (ToR 7)*

*1.2 Recommendation: That the Department of Health be obliged through legislation to provide a broad and detailed analysis of the health outcomes for any new coal, gas or oil extraction projects, and for the expansion of existing coal, gas or oil projects (ToR 7)*

*1.3 Recommendation: That the WA Department of Health assumes a visible, transformational leadership position in articulating the relationship between health and the climate crisis and the need for emissions reduction, and in transitioning the WA Government and communities to ambitious policies and actions to address the climate emergency. (ToR 7)*

*1.4 Recommendation: That the WA Health Department has a key and publicly-visible role in regulating WA greenhouse gas emissions. (ToR 7)*

## 2. Climate justice and health

Climate change is a product of, and reproduces, systems of unequal power such as neoliberal capitalism, patriarchy and racism, through which multidimensional social injustices and environmental destruction emerge. Climate change is a slow-onset disaster that has already begun to impact negatively on key social determinants of health for people in communities across WA and the planet. The known hazards (extreme weather events) resulting from climate change have a serious impact on the physical environment in terms of safety (excessive heat, cold, flooding); food and water security; amenity and biodiversity. There is comprehensive evidence that people who already experience disadvantage and marginalisation are the most vulnerable to the health impacts of climate change, and these experiences are differentiated.

### Western Australian focus

The IPCC (2014) and existing research shows that groups that are particularly



### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

vulnerable to climate change in Australia are those who already experience disadvantage, including (but are not limited to) First Nations peoples, women, children and young people, elderly people, people with a disability, people of colour, LGBTI+ people, people on a low income, and people living in rural and remote communities (Alston 2011; Alston and Whittenbury 2013; Arabena and Kingsley 2015; Bell and Blahski 2014; Choy *et al.* 2013; Gorman-Murray *et al.* 2017; Hansen *et al.* 2013; Hughes *et al.* 2016; Parkinson *et al.* 2015; Sevoyan *et al.* 2013). In WA, it is likely that other vulnerable groups will also emerge as a result of climate change especially in drought prone areas or areas of high erosion or bushfire where communities are forced to relocate. Predictions have not been modelled, nor impact to health services estimated or health care management requirement of these groups in crisis or for the longer term. Health vulnerabilities to climate change are exacerbated by limited access to vital services, dependence on climatic factors for economic stability (such as tourism and agricultural production), rurality and remoteness, individual health conditions and disability, and the community's capacity to provide clean water, reliable energy, transport, communication, medical and other services (Spickett, Brown & Katscherian, 2008).

The economic impacts of climate change adversely affect communities through decrease in the availability of goods and services, reduced capacity for community resilience, reduction of available goods and services (fresh food, water, energy efficient housing), a decrease in community resilience (coastal communities might require suitable infrastructure to adjust to rising sea-level) and reductions in population; which all contribute to a decline in quality of life and adverse changes to mental and social health (Spickett, Brown & Katscherian, 2008). For example, the significant decrease in rock lobster fisheries in Abrolhos Islands resulted in environmental and social changes, including collapse of communities, stress-related health concerns, suicide attempts, increased domestic violence and abuse, increased alcohol and other drug use, loss of political power of women, departure of community members, and increase in men undertaking fly-in fly-out work and women single parenting (Shaw, Stocker & Noble 2015). A similar outcome has occurred in WA farming communities in their response to drought with devastating losses of livestock, crops and horticulture, as well as human resources. Health impacts include higher suicide rates in farming communities, greater mean age of farmers and regional families relocating to urban areas for a range of economic, social and health reasons.

#### *Ecojustice: a pathway to change*

Understanding that climate change exacerbates existing injustice and inequalities, climate justice encompasses 'principles of democratic accountability and participation, ecological sustainability and social justice and their combined ability to provide solutions to climate change' (McGregor, 2010 p.606). Climate justice involves empowering marginalised communities and resisting corporatisation (Evans, 2010) to facilitate a just transition to an alternative system that upholds ecological health and universal human rights where no one is left behind. An

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

intersectional approach to climate justice reclaims citizenship to challenge the devaluation of the rights of people and nature, the homogenising of experiences of injustice, and structural forces of unequal power (Kaijser & Kronsell 2014). In the context of ecojustice, social and economic changes to prevent, mitigate, respond and adapt to climate changes caused by increasing global temperatures will need to take account of social, cultural, political and economic factors alongside ecological ones. Government will need to consider the needs of diverse populations and avoid a business-as-usual response which will simply reproduce existing inequities in societies largely based on gender, faith, culture, ethnicity, social class, sexual orientation and so-called able-bodiedness.

For example, disability can be understood as located in individuals with impairments; or as located in social, economic and political barriers to people with impairments' full participation in mainstream society – this latter social constructionist understanding is frequently referred to as the *social model of disability* (Oliver and Barnes 2012). In relation to climate change, changes in social and environmental conditions may lead to further barriers to inclusion and thus further disablement of people with disabilities. For example, in the aftermath of Hurricane Katrina in the US, people with disabilities were literally 'left behind' by first responders (White et al, 20016; Fox et al, 2007). It is also important to take account of the roles that people with disabilities and their organisations can play in disaster management and the valuable 'expertise from experience' they can offer. It is vital that this expertise from experience is tapped, rather than depending on the professional knowledge of service providers and NGOs, which may prove inadequate beyond normal service provision environments (Fox et al, 2007).

The listed ECU academics in this submission define health in a holistic way, whereby the health of humans encompasses physical, psychological, emotional, spiritual, family, and community health. Acknowledging and reinforcing the knowledges of First Nations peoples, disciplines such as ecohealth and eco-social work demonstrate that the health of people is dependent on the health of nature. A climate justice lens is therefore vital for the WA health system to respond to climate change.

#### *Climate justice, health and First Nations peoples*

Existing literature highlights that slow-onset climate change and climate-induced events significantly exacerbate existing health inequalities of First Nations peoples in Australia:

- Prevailing health concerns, low standards of living and limited infrastructure within remote First Nations communities means they have greater vulnerability to climate change as they will likely find it harder to adapt (Spickett, Brown & Katscherian, 2008).
- Climate-induced changes to identity and place can cause sadness and 'solastalgia' (distress from environmental change) for First Nations peoples (McNamara & Westoby 2011).
- Climate events may damage or destroy cultural heritage sites and wild food

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

networks (Choy *et al.* 2013).

- Due to climate change, First Nations peoples may be displaced from country and relocated to increasingly stressed urban settings (Hunter 2009, Zander *et al.* 2013, Arabena and Kingsley 2015).
- First Nations peoples' vulnerability to climate change is exacerbated by existing inequalities such as lower life expectancy and higher rates of disability, chronic disease, suicide, unemployment, poverty, family and community violence, and overcrowded and poor housing, compared with non-Indigenous Australians (Campbell *et al.* 2008, Hunter 2009, Petheram *et al.* 2010, Choy *et al.* 2013, Green and Minchin 2014, Steering Committee for the Review of Government Service Provision 2016).
- Some climate change health impacts for First Nations peoples in Australia include increased tropical, communicable, vector-, water- and mosquito-borne diseases, respiratory illnesses, dehydration, psychological distress, anxiety, mental illness, substance use, heat stress, and mortality, aggravated by poor access to health services (Campbell *et al.* 2008, Hunter 2009, Arabena and Kingsley 2015).
- Case study research from the Kimberley region identifies that lack of resources and socioeconomic dysfunction are key concerns regarding the existing and future impacts of climate change, and proposed actions include training Aboriginal people to be part of emergency management, involving Aboriginal people in adaptation planning, and ensuring climate responses respond to the worldviews, identities, traditions, practices and complexities of Aboriginal cultures in the Kimberley (Leonard *et al.* 2013).
- First Nations weather knowledge, peoples and rights are generally excluded from climate change decision-making and policy that privilege white, male perspectives (Alston and Mason 2008, Gerrard 2008, Petheram *et al.* 2010, Ford 2012, Choy *et al.* 2013). However, it is argued that inclusive climate change adaptation approaches that balance social, environmental, cultural and economic needs could benefit First Nations peoples (Petheram *et al.* 2010, Choy *et al.* 2013, Green and Minchin 2014, Arabena and Kinglsey 2015).

*2.1 Recommendation: That First Nations peoples, current and emerging vulnerable peoples, and their organisations in WA are directly involved in decision-making and co-design of climate health responses through partnerships that respond to localised needs and capacities. (ToR 9)*

#### ECU research regarding climate justice and health in WA

Research by numerous ECU academics highlights a number of health impacts of climate change in Western Australia, demonstrating climate injustices are already occurring in the state. In response to this ECU is undertaking numerous

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

collaborative initiatives to address these challenges.

#### Exemplars of action

- ECU research regarding food security in WA identifies that rural and remote communities are experiencing reduced food availability and access due to climate change, including changes in rainfall, droughts, extreme weather, and increased ocean temperatures and rising sea levels. Effects on access and availability of food include shorter growing seasons, crop destruction, decreased yields, faster rates of land degradation, reduced quality of crops including fruits, vegetables and grains, and road closures which limit access to food and increase cost of food and increase in pests and vermin.
- Vulnerable groups are particularly susceptible to these impacts, including children, migrants, people with unstable employment, Aboriginal and Torres Strait Islander peoples, people experiencing homelessness, people living in poverty, and elderly and young people. Interconnected issues can include inequitable health service provision for these groups, and limited cooking and nutritional knowledge. Other barriers to healthy, regionally-produced food includes budgetary issues, seasonal availability of produce and transport issues. (See Inquiry submission from Dr Stephanie Godrich et al.).
- Climate injustice is exacerbated when people experiencing greater disadvantage have poorer access to healthy food outlets and therefore experience poorer health outcomes. (See Inquiry submission from Professor Amanda Devine)
- Extensive Australian research shows that climate change exacerbates gendered inequalities, with differentiated impacts on women, men and non-binary folks (see, for example, Alston 2011; Alston & Whittenbury 2013; Parkinson 2015). During and after climate events, women are at risk of increased domestic and family violence, increased economic tensions and unpaid labour, and health impacts such as increased stress during pregnancy, lack of access to nutritious food, reduced access to contraceptives and maternal health, and a tendency to ignore their own health to prioritise the health of male partners. In Australia, men are more likely to die in bushfires and women are more likely to die in heat waves. (See Inquiry submission from Dr Naomi Godden).
- Ecological grief (climate grief, solastagia, (Albrecht 2017), eco-grief) is having a significant impact on climate change mitigation and adaptation in two main ways. The first is that widespread disenfranchised (unacknowledged) grief affects the capacity and willingness to respond to the climate emergency at political, community, family and individual levels. The second is that ecological grief is contributing to increasing levels of depression, anxiety and suicide. This is an under acknowledged mental health crisis. (See Inquiry submission from Dr Susan Bailey).
- Occupational heat stress is currently present and likely to worsen. (See Inquiry submission from Professor Jacques Oosthuizen)

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

- Vulnerable groups experience difficulties coping with and adapting to heat. (See Inquiry submission from Dr. Lauren Bloomfield et al.)
- There is a risk of increase in cases of human disease due to communicable disease outbreaks. (See Inquiry submission from Professor Jacques Oosthuizen)
- Increases in temperature, changes in weather patterns and UV levels may affect skin cancer. (See Inquiry submission from Dr Joseph Scott)
- Adolescents have the highest incidences of sunburns and repeat sunburns. This health compromising behaviour occurs despite the knowledge that simple preventive actions reduce harm. (See Inquiry submission from Dr Donna Barwood and Associate Professor Andrew Jones).
- Interactions between ozone depletion and climate change may slow the recovery of the ozone layer and compound increases in UV radiation at some latitudes. Before recovery, it is expected that higher levels of UV radiation will continue in most Australian regions, with an associated higher risk of skin cancer. Recent data show increases in surface UV radiation throughout Australia since the 1970s. Second, mean temperatures in Australia have increased over the past 30 years and are projected to rise further by 2030. It is of note that research at ECU have demonstrated that combined exposure to UV radiation and increasing heat stress alters the morphology and molecular biology of skin cells, and therefore potentiating the risk for skin cancer formation (Calapre et al., 2015, Calapre et al., 2016, Calapre et al., 2017) . These findings supports the need to strengthen public health campaigns and inform changes in at-risk workplaces, such as in the mining and construction industries, where exposure to both UV and high temperatures are common. (Dr Leslie Calapre and Prof Mel Ziman)
- FIFO workers lose their acclimatisation status when they return home to a colder climate for their rest break. (See Inquiry submission from Dr Lauren Bloomfield et al. and Inquiry submission from Professor Jacques Oosthuizen)

*2.2 Recommendation: That WA Department of Health establishes current knowledge on the implications of climate change for health in WA and recommends a framework for evaluating future implications incorporating the ecojustice lens. (ToR 7)*

*2.3 Recommendation: That WA Department of Health supports wider dissemination of climate and health information and impacts to all sectors to drive policy awareness, implementation, monitoring and evaluation. (ToR 7)*

*2.4 Recommendation: That climate health responses are place-based and respond to the differentiated experiences and issues of vulnerable groups that builds on existing work from ECU. (ToR 3 and 7)*

*2.5 Recommendation: That people who are most affected by climate change are included in co-design and decision-making regarding climate health programs and policies that builds on existing work from ECU . (ToR 3 and 7)*

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

#### 3. WA health system and climate change mitigation

There are health benefits from *preventing* climate change, but it is unlikely that there will be benefits from mitigating the impact of climate change other than obviously attempting to *minimise* the already well-documented disruptive consequences of a warming planet. As the lead agency responsible for the prevention, mitigation and preparedness for climate change, the WA Department of Health has a critical role to play in minimising throughput in its systems of consumption, servicing and transport in order to reduce carbon emissions. The obvious immediate initiatives would relate to procurement, procedures to *minimise emissions and waste*, e.g. electric vehicles; maximising the use of renewable energy; autoclaving rather than single-use instruments; processes to allow for food to be grown and prepared on hospital sites with capacity for composting; reducing or eliminating single use items across the organisation (offices, hospitals, food outlets, etc). WA Department of Health needs to develop practical actions for the short, medium and long term that prioritise local food systems. There is a need for clearly prescribed actions for the individual, community and system to ensure a cohesive approach; that is simply, reduce, reuse, repurpose, recycle across the entire system (closed loop). This would not only have an impact in terms of its own emissions, but the WA Department of Health would also become a role model and could provide leadership in relation to other government departments and the private for-profit and not-for-profit agencies it works with.

#### Exemplars of action

We identify the following global examples of climate change mitigation within other health systems that highlight how health services can reduce their carbon footprint:

- Newcastle Foundation Trust (UK) manages two hospitals with 15,000 staff and 2 million patient visits per year and 8,000 tonnes of annual waste. It has pledged to become carbon neutral by 2040. The Trust has generated its own energy since 2000, has zero waste to landfill since 2011, has invested in a fleet of electric buses, works with local government to ensure good access to public transport, provides cycling facilities, and includes sustainability specification and evaluation criteria in all procurement contracts (please see <http://www.newcastle-hospitals.org.uk/news/news-item-23892.aspx>)
- In 2009, the National Health Service (UK) adopted the NHS Carbon Reduction Strategy for England, with a plan to reduce carbon emissions and establish the NHS as a leading sustainable and low carbon organisation (please see <https://www.sduhealth.org.uk/policy-strategy/engagement-resources/nhs-carbon-reduction-strategy-2009.aspx>)
- The UK public health system has a Sustainable Development Unit (funded by NHS and Public Health England) and in 2014, launched the Sustainable Development Strategy for the Health, Public Health and Social Care System 2014-2020. The Strategy “describes the vision for a sustainable health and care system by reducing carbon emissions, protecting natural resources, preparing

## Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

communities for extreme weather events and promoting healthy lifestyles and environments” (please see <https://www.sduhealth.org.uk/policy-strategy/engagement-resources.aspx>)

*3.1 Recommendation: That the WA health sector (public, private and community) collaboratively develops an action plan to transition to net zero greenhouse gas emissions by 2030, and that resources are provided by the WA Department of Health to achieve this goal. The plan can include actions such as the installation and use of carbon-free energy, the use of carbon-free transport, waste reduction and management, carbon-offsetting, sourcing low-emissions food, planting trees and enhancing bushland, healthy food environments and role modelling and educating staff and community. This should be supported by a regulatory framework with high targets and a monitoring strategy with levels of accountability and defined timelines to ensure actions are achieved in a timely manner. (ToR 2, 3 and 4)*

*3.2 Recommendation: That WA Department of Health develops strong internal climate change mitigation and adaptation policies, strategies and practices across all of its work that show clear concern and leadership in terms of greenhouse gas emissions reduction, sustainability and waste, and develops accountability processes to model the change that is required. (ToR 2, 4 and 7)*

*3.3 Recommendation: That WA Government-run health services do not accept sponsorship or allow advertising from fossil fuel or “big food” companies for health programs, facilities, research or staff support programs. (ToR 7)*

*3.4 Recommendation: That services contracted by the WA Department of Health have a condition of their contract not to accept fossil fuel or “big food” advertising or financial support. (ToR 7)*

*3.5 Recommendation: That WA Department of Health works with relevant departments such as Department of Primary Industry and Regional Development, Department of Planning, Department of Water and Environmental Regulation, to develop greenhouse gas emissions, water, soil and local food security management strategies across the natural, built and social cultural environments. (ToR 7)*

*3.6 Recommendation: That WA Department of Health promotes the use of consistent communication and messaging to profile/promote local health initiatives that reduce emissions and waste. (ToR 7)*

## 4. Climate change adaptation

We are concerned that actions arising from this Inquiry will mainly focus on climate change adaptation. As public health academics and practitioners, we understand that prevention is the most effective and efficient way to ensure good health. There are limits to adaptation, and it is probable that the impacts of climate change will initiate unforeseen negative outcomes or unintentional consequences. Nevertheless, given that climate change is already occurring, the climate emergency requires

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

adaptation action in addition to prevention and mitigation.

#### Exemplars of action

A variety of ECU research has identified some effective adaptation actions to address climate injustices, particularly in relation to food:

- Have a place-based focus and transition current systems using a co-designed manner. (See Inquiry submission by Dr Stephanie Godrich et al.)
- Strengthen local food systems and increase consumer education strategies for utilising seasonal produce and regionally grown fresh fruits and vegetables (See Inquiry submission by Dr Stephanie Godrich et al.)
- Use common language, branding, role models for change and combining resources (See Inquiry submission by Dr Stephanie Godrich et al.)
- The early childhood education and care is an entry point for interventions that can influence children's lifelong eating habits and health outcomes (Briley & McAllaster, 2011) but is underutilised and requires more oversight to improve efforts towards a healthy food environment. (See Inquiry submission by Professor Amanda Devine et al.)
- Enhance curriculum content for the early years sector to include early introduction to agriculture, food and climate systems. (See Inquiry submission by Professor Amanda Devine et al.)
- Ensure continued professional development for early years educators relating to climate and agriculture content and its relation to the food system and health (See Inquiry submission by Professor Amanda Devine et al.)
- A multi-sectorial approach is critical to food system transformation. This can be supported by a mechanism that improves institutional arrangements and frameworks across agriculture, environment, finance, health, education, etc. (See Inquiry submission from Ms. Ros Sambell).
- A higher proportion of healthy food outlets can increase the purchasing and consumption of foods such as fruit and vegetables, which is associated with good health. (See Inquiry submission by Professor Amanda Devine).
- The Healthy Active by Design resource supports planning/retro-fitting suburbs, health services to consider the built food environment, peri urban space, natural bushlands and social cultural and economic impacts. (See Inquiry submission by Professor Amanda Devine).
- The preservation of agricultural land on the urban fringe (rather than residential development) can support urban food production. (See Inquiry submission by Professor Amanda Devine).
- Disaster preparedness and planning efforts centred around the impacts of extreme weather events in various regions of WA should include a focus on



### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

communicable disease outbreaks (See Inquiry submission from Dr Lauren Bloomfield et al.).

- Foods that are grown through regenerative farming practices have reduced inputs and retains the integrity of our WA landscape (See Inquiry submission by Professor Amanda Devine et al.).

#### Exemplars of action

Further to this, ECU is engaged in various research programs to address the impacts of climate change and environmental degradation:

- ECU is currently conducting a pilot study to determine whether microplastics are also present in the Western Australian food supply, the extent of contamination, and associations with dietary intake. Dependent on the research findings, ECU will work with the agricultural, food manufacturing and water treatment sectors to optimise practices, and further examine potential risks to public health. Ultimately, this research hopes to inform public health practice and policy to ensure a healthier food supply for all Australians (See inquiry submission from Dr Angela Genoni).
- ECU conducted the South West Food Community pilot project using an Australian-first the Systemic Innovation Lab approach<sup>9</sup> in the South West region of WA. Key 'windows of opportunity' to enhance food security across the system between government-community interface focus areas were examined to determine both unplanned exploration and planned exploitation of community knowledge in government policy. Other key gaps related to use of common language, branding, role models for change and combining resources. This approach could support community-level food security action and strengthen the communities' resilience against the food-related impacts of climate change. (See Inquiry submission by Dr Stephanie Godrich et al.)
- ECU are working with Perth Natural Resources Management and others on a collaborative project - Healthy Soils Healthy Communities - that connects local regenerative farmers with consumers and other stakeholders in the food system. (See Inquiry submission by Professor Amanda Devine et al.).
- ECU staff have convened the National Nutrition Network – Early Childhood Education and Care (NNN-ECEC) which hosts 32 national and international members from universities or practitioner environments. This Network provides a unique opportunity to facilitate language and educational messaging to key stakeholders including ACECQA (accrediting bodies), government and non-government organisations that engage with this sector. The current body of work encompasses harmonisation of food environment guidelines and food environment policy scoping. This could inform future policy inclusions in readiness of the impact of climate change. (See Inquiry submission by Professor Amanda Devine et al.).
- Since 2014, the Refresh.ED program, developed at ECU and funded by WA

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

DOH, has provided multiple opportunities for teachers of children K-10 to enhance food literacy and nutrition education through an online platform with age relevant support materials linked to the curriculum. This platform is adding agricultural education relating to nutrition and health to educate children about the impact of climate change, mitigation, adaptation and prevention strategies(See Inquiry submission by Professor Amanda Devine et al.).

- ECU researchers are engaging in research regarding occupational heat stress and communicable disease control. For example, regarding communicable disease control, ECU Lecturer Ms. Kerry Staples is developing a mathematical model that will be able to use various environmental inputs to ascertain when we can expect a plague of mosquitoes, helping us to eradicate them more effectively by putting less chemicals into the environment as our treatments will be more targeted to maximise effectiveness.
- Dr Joseph Scott's research at Edith Cowan University focuses predominantly on educating Western Australian primary pre- and in-service teachers on the science behind UV; proper sun protective measures to reduce health risks; and effective strength-based sun education strategies for children.
- Dr Leslie Calapre's research is focused on skin cancers, particularly in identifying blood biomarkers and understanding the impacts of environmental stressors such as UV radiation and heat stress on skin cell biology.
- ECU via the School of Medical and Health Sciences trains students to both assess and respond to Global Health issues resulting from climate change, via Community Development Strategies and Global Health Response techniques.

*4.1 Recommendation: That WA Department of Health partners with ECU to model climate scenarios and monitor health issues such as heat stress and communicable diseases amongst vulnerable populations and adequately resource evidence-based intervention programs. (ToR 2)*

*4.2 Recommendation: That WA Department of Health supports and resources Local Government Authorities to address climate health concerns in their Public Health Plans. (ToR 7)*

*4.3 Recommendation: That WA Department of Health works with relevant departments including Department of Planning, Land and Heritage to promote and use the Healthy Active by Design resource when planning/retro-fitting suburbs, health services to consider the built food environment, peri urban space, natural bushlands and social cultural and economic impacts. (ToR 2, 4 and 7)*

### 5. Ecosystem approaches to human health and well-being

An ecosystem approach to health and well-being builds on the interdependence of social and ecological systems. Both the social and the ecological determinants of health need recognition by the Department of Health and the health sector more

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

broadly.

ECU research highlights the importance of the retention of bushlands and wetlands and effective water resource management for health. For example, in an [article](#) written for The Conversation, ECU Professor Pierre Horwitz and colleagues outline the health benefits of urban bushland, such as filtering air and water; help avoid extreme temperatures; green space for exercising and social engagement. They demonstrate that exposure to green space and biodiversity is associated with lower rates of chronic illness, less heart disease, obesity and diabetes, lower stress, improved mental health, and enhanced immunity. Importantly, access to urban bushland must be fairly distributed across the population to help address health inequalities for lower income peoples. Horwitz and colleagues propose that in urban planning, cost-benefit analysis can account for the health effects associated with local bushland, and suggest that health impact assessments scoped and framed by ecosystem services are used more widely in decision-making for development and natural resource management (Horwitz & Parkes 2016).

Professor Horwitz also highlights that the health sector needs to be involved in water resource management. The Darling escarpment in the SW corner of Australia is heavily forested, receives relatively high rainfall and forms important catchments for water supply reservoirs, irrigation and wetlands on the coastal plains. Nine reservoirs within the Darling Range contribute to Perth's water supply. These high value catchments have experienced declining water yield since 1975 due to ongoing rainfall deficit (Hope et al. 2006). The decline in surface water has seen the region becoming increasingly reliant on groundwater (McFarlane et al. 2012). However, catchment management remains critical; the reservoirs receive catchment water from surface flows, and also receive treated groundwater and desalinated water that is pumped into them as holding capacity, meaning that they store and supply around one third of Perth's water. The imperative to address risks from catchment processes is paramount.

These forested ecosystems, which support important water supply catchments for Perth, are extremely flammable and subject to highly erosive rain storms. Significant declines in rainfall in recent decades, warming trends and an increased incidence of weather extremes suggest worsening bushfire conditions for the region (see Dowdy 2018). Already bushfire statistics show an increase in area burnt by large summer bushfires since the early 2000s. Recent wildfires in the region (e.g. Peace et al. 2017) have highlighted that the water supply system may be vulnerable to impact from post-fire erosion with large documented increases in turbidity at least. Data on post-fire erosion response, including the production, mobility and transport processes and hydrological connectivity (and what they depend upon) are needed to support the development of models that are relevant to the landform, soil, vegetation and climate in this distinctive region, and the differences between low intensity and high intensity fires. More generally in the post-fire hydrological research domain, there are fundamental research gaps related to the availability and mobility of water quality constituents after fire (Nunes *et al.*, 2018). The relations between fire severity

### Submissions response field

**Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).**

and the availability and mobility of contaminants such as heavy metals, nutrients and polyaromatic hydrocarbons (PAHs) on hillslopes are poorly quantified. Constituent loads, their association with different grain size fractions in soil and ash, their solubility and physicochemical transformations during transport are all important factors for determining water quality impacts. Quantifying these attributes of burned ash and soil is critical for modelling water quality impacts associated with both wildfire and planned burns in water supply catchments. A recently funded large ECU project seeks to examine these consequences for fire in Perth's drinking water catchments.

Regarding drought, wetland sediments, acidification and fire, ECU researchers (Sommer & Horwitz 2001) have been able to link drought with the acidification of coastal freshwater systems, where drying alone is sufficient to expose acid sulphate soils. It is also relevant because, as they have shown, fire can have the same effects, oxidizing acid sulphate soils and thereby generating an acidification response. The process of acidification is significant because it mobilizes heavy metals in the sediment, many of them have a toxicity to which people are exposed when groundwater downstream of the acidified sediments is drawn up by bore owners.

ECU researchers such as Dr Susan Bailey are also examining ecological grief as a psychological response to environmental degradation. It has been identified that people have the ability to form strong personal relationships with their local settings, creating 'emotional and psychological needs related to identity, belonging, security, self-esteem, self-efficacy and solace' (Ellis & Albrecht 2017 p. 163). When a loved home environment (or connection/association to place) is lost or changed due to environmental, technical or economic disasters, people may experience feelings of 'grief, trauma, homesickness, nostalgia, alienation, depression, anxiety and loss (Ellis & Albrecht 2017 p.161), causing a sense of grief, anxiety and longer-term post-traumatic stress and depression. Climate change can also disrupt people-place relationships through longer-term processes of environmental change, with the potentiality to decline mental health and wellbeing. As such, place-based approaches to rural mental health practice and policy are required.

The point being made here with these examples is that health outcomes are improved by better managed ecosystems, and that human exposures and their health and well-being consequences, are a product of human demands on those ecosystems. Climate change is one more, serious, upstream driver for these relationships.

*5.1 Recommendation: That the WA Department of Health and health sector becomes more actively involved in the retention and enhancement of urban bushland to promote improved health outcomes. (ToR 7)*

*5.2 Recommendation: That the WA Department of Health and WA health sector become more actively involved in planning decisions for land and water use, and in natural resource management to ensure environmental decision-making addresses*

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

*human health needs. (ToR 1, 7)*

*5.3 Recommendation: That ecological grief is adequately incorporated into the WA Department of Health's work regarding health and climate change, with place-based responses. (ToR 7)*

#### 6. Mainstreaming climate justice in the WA health system

Given the relationship between human health and all other aspects of human society, it makes sense for the Department of Health to *coordinate* the management of prevention, mitigation, preparedness, response and adaptation to climate change alongside other relevant agencies. WA has a well-developed emergency management response system and lead agencies could continue to be assigned as they are now, based on the type of emergency (eg. flood, landslide, bushfire). However, the Department of Health (as a place-based agency with roles, responsibilities, personnel and infrastructure across the whole state) is best placed to act as the lead agency. Further to this, there is considerable scope for climate justice to be mainstreamed across all of Department of Health, to embed climate change prevention, mitigation, adaptation and response in every area of practice.

*6.1 Recommendation: That climate justice is integrated and mainstreamed through all areas of work in the WA health system (including services, policies, programs, job descriptions, KPIs, funding, research and facilities) to prevent the harmful health impacts of climate change and support communities to adapt to climate change, ensuring that no one is left behind. (ToR 7)*

In addition to mainstreaming climate justice across all areas of the Department's work, there is also considerable scope to develop specialised climate justice officers and teams that can facilitate climate health actions. It is recommended that WA Department of Health form a Global Health Response team to facilitate and respond to climate change issues via policy development and facilitated interventions. The team, comprised of Climate Justice Health Promotion Practitioners, can provide specialist approaches to address issues such as, and not limited to the spread and variance in communicable disease, nutrition and food security challenges, healthy built environment planning policies, active transport approaches, social justice climate interventions. To ensure a long term and sustained approach to the formulation of Global Health response team, it is recommended that the Department of Health support a number of Global Health Officer traineeships and internships for Health Promotion graduates, to support innovation in climate change responses, policy and program development. It is recommended that Global Health Officer Traineeships are placed in health services across the state with particular emphasis on regional and remote areas as a priority, and is built as a role into the Public Health Plans in response to the needs of all communities including disadvantaged and vulnerable groups.

*6.2 Recommendation: That WA Department of Health works collaboratively with ECU to form a Global Health Response team to facilitate and respond to climate*

## Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

*change issues via policy development and facilitated interventions, and develop a program of works to train the future workforce in climate justice and health. (ToR 7)*

*6.3 Recommendation: That the Environmental Health Directorate to have a clear policy of supporting research into climate change impacts, and have an Officer or section allocated to support the role and provide a liaison with researchers/industry. (ToR 7)*

*6.4 Recommendation: That WA Department of Health works collaboratively with multisectoral stakeholders to establish a register of local climate initiatives that can be supported by volunteers (from universities, schools, retail groups, community groups etc) to undertake GHG offset actions, and promote these through DoH's media channels. (ToR 7)*

*6.5 Recommendation: That WA Department of Health guides Local Government Authorities on how to strategically catalyse required change for climate justice. (ToR 7)*

*6.6 Recommendation: That WA Department of Health supports collation of Local Government Authority activities (captured through monitoring) to feedback to federal government as part of Sustainable Development Goals reporting. (ToR 7)*

## 7. Conclusion

Through a focus on 'climate justice', this submission has demonstrated that more ambitious emissions reductions targets are needed in WA to avoid catastrophic climate change, along with equitable and coordinated adaptation action to protect the human rights, health and wellbeing of peoples most at risk of climate change and support the survival of vulnerable ecosystems. We argue that a common climate justice narrative and approach is required interdepartmentally in the WA Government (with clear policies and alignment across portfolios and departments), and across the WA health sector. We stress that strategies for climate change mitigation and adaptation need to be cross sectorial and implemented at an individual, community and system level.

The WA Government requires courage to demonstrate the strong leadership and associated responsibility to implement a range of cohesive and coherent policies across a range of climate drivers including fossil fuel extraction, consumption and export, energy, the food system, environmental management, education, transport and town planning to address the health needs of current and future generations. It is imperative that the decisions of today protect the Western Australian community for current and future generations.

## References

Albrecht, G. (2017). Solastalgia and the New Mourning. In A. Cunsolo & K. Landman (Eds.), *Mourning Nature. Hope at the Heart of Ecological Loss and Grief* (pp.

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

- 292-315). Canada: McGill-Queen's University Press.
- Alston, M. and Mason, R. 2008. Who determines access to Australia's water? Social flow, gender, citizenship and stakeholder priorities in the Australian water crisis. *Rural Society*, 18 (3), 214-219.
- Alston, M., 2011. Gender and climate change in Australia. *Journal of Sociology*, 47 (1), 53-70.
- Alston, M. and Whittenbury, K. eds. 2013. *Research, action and policy: Addressing the gendered impacts of climate change*. New York: Springer.
- Arabena, K. & Kingsley, J. 2015. Climate change: Impact on country and Aboriginal and Torres Strait Islander culture. In: R. Walker and W. Mason, eds. *Climate change adaptation for health and social services*. Clayton South, Australia: CSIRO Publishing, 141-158.
- Atkisson, A. 2011. *Believing Cassandra: How to be an optimist in a pessimist's world* (2nd ed.). London: Earthscan.
- Bell, E. and Blahski, G. 2014. A method for assessing community flood management knowledge for vulnerable groups: Australia's 2010–2011 floods. *Community Development Journal*, 49 (1), 85-110.
- Calapre, L., Gray, E. S., Kurdykowski, S., David, A., Descargues, P., & Ziman, M. 2017. SIRT1 activation mediates heat-induced survival of UVB damaged Keratinocytes. *BMC Dermatol*, 17(1), 8.
- Calapre, L., Gray, E. S., Kurdykowski, S., David, A., Hart, P., Descargues, P., & Ziman, M. 2016. Heat-mediated reduction of apoptosis in UVB-damaged keratinocytes in vitro and in human skin ex vivo. *BMC Dermatol*, 16(1), 6.
- Calapre, L., Gray, E. S., & Ziman, M. 2013. Heat stress: a risk factor for skin carcinogenesis. *Cancer Lett*, 337(1), 35-40.
- Campbell, D., et al. 2008. Responding to health impacts of climate change in the Australian desert. *Rural and Remote Health*, 8 (3), 1008.
- Choy, D.L., et al. 2013. *Aboriginal reconnections: Understanding coastal urban and peri-urban Indigenous people's vulnerability and adaptive capacity to climate change*. Gold Coast, Australia: National Climate Change Adaptation Research Facility.
- Cunsolo, A., & Landman, K. (Eds.). (2017). *Mourning Nature. Hope at the Heart of Ecological Loss and Grief*. London: McGill-Queens University Press.
- Department of the Environment and Energy. 2019. *Australia's Greenhouse Gas Inventory* (online). Available from: <http://ageis.climatechange.gov.au/SGGI.aspx>
- Dowdy, A.J. 2018. Climatological variability of fire weather in Australia. *J. App. Meteor. Clim.* 57 (2), 221-234.

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

- Ellis, N. R., & Albrecht, G. A. 2017. Climate change threats to family farmers' sense of place and mental wellbeing: A case study from the Western Australian Wheatbelt. *Social Science & Medicine*, (175), 161-168.
- Evans, G. 2010. A rising tide: Linking local and global climate justice. *The Journal of Australian Political Economy*, 66, 199-221.
- Ford, J.D. 2012. Indigenous health and climate change. *American Journal of Public Health*, 102 (7), 1260-1266.
- Fox, M. H., White, G. W., Rooney, C., & Rowland, J. L. 2007. Disaster preparedness and response for persons with mobility impairments: Results from the University of Kansas Nobody Left Behind Study. *Journal of Disability Policy Studies*, 17 (4), 196-205.
- Gerrard, E. 2008. Climate change and human rights: Issues and opportunities for indigenous peoples, *UNSW Law Journal* 31, 941-952.
- Gorman-Murray, A., et al. 2017. Problems and possibilities on the margins: LGBT experiences in the 2011 Queensland floods. *Gender, Place & Culture*, 24 (1), 37-51.
- Green, D. & Minchin, L. 2014. Living on climate-changed country: Indigenous health, well-being and climate change in remote Australian communities. *EcoHealth*, 11 (2), 263–272.
- Hansen, A., et al. 2013. *Extreme heat and climate change: Adaptation in culturally and linguistically diverse (CALD) communities*. Gold Coast, Australia: National Climate Change Adaptation Research Facility.
- Hare, B., Roming, N., Fuentes Hutfilter, U., Schaeffer, M. & Beer, M. 2018. *Western Australia's Gas Gamble: Implications of exploiting Canning Basin and other unconventional gas resources for achieving climate targets*. Perth: Climate Analytics.
- Head, L. (2016). *Hope and Grief in the Anthropocene. Reconceptualising human-nature relations*. London: Routledge.
- Hewitt, K. K., Davis, A., & Lashley, C. 2014. Transformational and transformative leadership in an innovative partnership-based leadership preparation program *Journal of Research on Leadership Education*, 9 (3), 225-253. doi: 10.1177/194277511455232
- Hope et al. 2006. Shifts in the synoptic systems influencing southwest Western Australia. *Climate Dynamics*, 26(7-8), 751-764.
- Horwitz, P., Reid, A., & Lawrence, C. 2017. *How urban bushland improves our health and why urban planners need to listen* (online), *The Conversation*, 4 May 2017, available from: <https://theconversation.com/how-urban-bushland-improves-our-health-and-why-planners-need-to-listen-72876>
- Horwitz, P., & Parkes, M. W. (2016). Scoping health impact assessment: ecosystem



### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

services as a framing device. *Handbook on Biodiversity and Ecosystem Services in Impact Assessment*; Edward Elgar Publishing: Northampton, MA, USA, pp. 62-85.

Hughes, L., et al. 2016. *On the frontline: Climate change & rural communities*. Australia: Climate Council of Australia.

Hunter, E., 2009. 'Radical hope' and rain: Climate change and the mental health of Indigenous residents of northern Australia. *Australasian Psychiatry*, 17 (6), 445-452.

Ife, J. 2016. *Community development in an uncertain world: Vision, analysis and practice* (2nd ed.). Port Melbourne, Australia: Cambridge University Press.

IPCC 2014. *Climate change 2014. Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Working Group II contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. New York, NY: Cambridge University Press.

IPCC 2018. *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, Intergovernmental Panel on Climate Change.

Kaijser, A. & Kronsell, A. 2014. Climate change through the lens of intersectionality, *Environmental Politics*, 23 (3), 417-433.

Leonard, S., Mackenzie, J., Kofod, F., Parsons, M., Langton, M., Russ, P., . . . Smith, M. 2013. Indigenous climate change adaptation in the Kimberley region of North-western Australia. *Learning from the past, adapting in the future: Identifying pathways to successful adaptation in indigenous communities*. National Climate Change Adaptation Research Facility Gold Coast. Retrieved

from [https://www.terranova.org.au/repository/nccarf/indigenous-climate-change-adaptation-in-the-kimberly-region-of-north-western-australia/leonard\\_2013\\_indigenous\\_climate\\_change\\_adaptation.pdf](https://www.terranova.org.au/repository/nccarf/indigenous-climate-change-adaptation-in-the-kimberly-region-of-north-western-australia/leonard_2013_indigenous_climate_change_adaptation.pdf)

McFarlane et al. 2012. Managing groundwater levels in the face of uncertainty and change: A case study from Gngangara. *Water Sci Tech: Water Supply*, 12 (3), 321-328.

MacGregor, S. 2014. Only resist: Feminist ecological citizenship and the post-politics of climate change. *Hypatia*, 29 (3), 617-633

McNamara, K.E. & Westoby, R., 2011. Solastalgia and the gendered nature of climate change: An example from Erub Island, Torres Strait. *EcoHealth*, 8 (2), 233-236.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. B. 1972. *The limits to growth*. New York: Universe Books.

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

Meadows, D. H. 1997. Places to intervene in a system (in increasing order of effectiveness). *Whole Earth, Winter, 91*, 78-84.

Nunes, J.P. et al. 2018. Assessing water contamination risk from vegetation fires: Challenges, opportunities and a framework for progress. *Hydrol. Proc.* 32, 687-694.

Oliver, M., & Barnes, C. 2012. *The new politics of disablement*. Basingstoke, UK: Palgrave Macmillan.

Parkinson, D. and Zara, C., 2013. The hidden disaster: Domestic violence in the aftermath of natural disaster. *Australian Journal of Emergency Management*, 28 (2), 28-35.

Peace, M. et al. 2017. Meteorological drivers of extreme fire behaviour during the Waroona bushfire, Western Australia. *J South. Hemisphere Earth Syst Sci* 67 (2), 79-106.

Pedersen, K. 1998. Environmental ethics in interreligious perspective: Comparative religious ethics and interreligious dialogue. In S. Twiss & B. Grelle (Eds.), *Explorations in global ethics* (pp. 253-290). Boulder, CO: Westview Press.

Petheram, L., et al. 2010. 'Strange changes': Indigenous perspectives of climate change and adaptation in NE Arnhem Land (Australia). *Global Environmental Change*, 20 (4), 681–692.

Pettit, J. 2018. Unpacking the “black box” of social movement leadership. Retrieved from [https://tcleadership.org/introduction/#\\_unpacking-the-black-box-of-social-movement-leadership](https://tcleadership.org/introduction/#_unpacking-the-black-box-of-social-movement-leadership)

Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G. 2019. Sustainable Development Report 2019. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).

Sevoyan, A., 2013. *Impact of climate change on disadvantaged groups: Issues and interventions*. Gold Coast, Australia: National Climate Change Adaptation Research Facility.

Shaw, J., Stocker, L., & Noble, L. 2015. Climate change and social impacts: women's perspectives from a fishing community in Western Australia. *Australian Journal of Maritime & Ocean Affairs*, 7(1), 38-51.

Shiva, V. 2005. *Earth democracy: Justice, sustainability, and peace*. Cambridge, MA: South End Press.

Spickett, J., Brown, H., & Katscherian, D. 2008. Health impacts of climate change: adaptation strategies for Western Australia. Retrieved from <https://ww2.health.wa.gov.au/~media/Files/Corporate/general%20documents/Environmental%20health/Climate%20change/Health-impacts-of-climate-change.pdf>

Springer, S. 2016. Fuck neoliberalism. *ACME: An International E-Journal for Critical*

### Submissions response field

Please type your response to the item(s) selected above into the field below. Alternatively you may provide your submission as a separate attachment (suggested maximum 5 pages).

*Geographies*, 15 (2), 285-292.

Sommer, B. & Horwitz, P. 2001. Water quality and macroinvertebrate response to acidification following intensified summer droughts in a Western Australian wetland. *Marine and Freshwater Research* 52, 1015-1021.

Steering Committee for the Review of Government Service Provision. 2016. *Overcoming indigenous disadvantage. Key Indicators 2016*. Canberra, Australia: Productivity Commission.

United Nations Environment. 2018. *The Emissions Gap Report 2018*. United Nations Environment: Nairobi.

Wardell-Johnson, G.A., Wardell-Johnson, K., Bradby, T., Robinson, P.W., Bateman, K., Williams, K., Braun, A., Keesing, A., Beckerling, J. and Burbridge, M. 2016. Application of a Gondwanan perspective to restore ecological integrity in the south-western Australian global biodiversity hotspot. *Restoration Ecology*, 24 (6), 805-815.

White, G. W., Fox, M. H., Rooney, C., & Cahill, A. 2006. *Assessing the impact of Hurricane Katrina on persons with disabilities*. Research and Training Center on Independent Living, University of Kansas.

Yanguas Parra, P., Hare, B., Fuentes Hutfilter, U. & Roming, N. 2019. *Evaluating the significance of Australia's global fossil fuel carbon footprint. Report prepared by Climate Analytics for the Australian Conservation Foundation*. Perth: Climate Analytics

Zander, K., Petheram, L. & Garnett, S.T. 2013. Stay or leave? Potential climate change adaptation strategies among Aboriginal people in coastal communities in northern Australia. *Natural Hazards*, 67 (2), 591–609.

**Please complete this sheet and submit with any attachments to: Climate Health WA Inquiry**