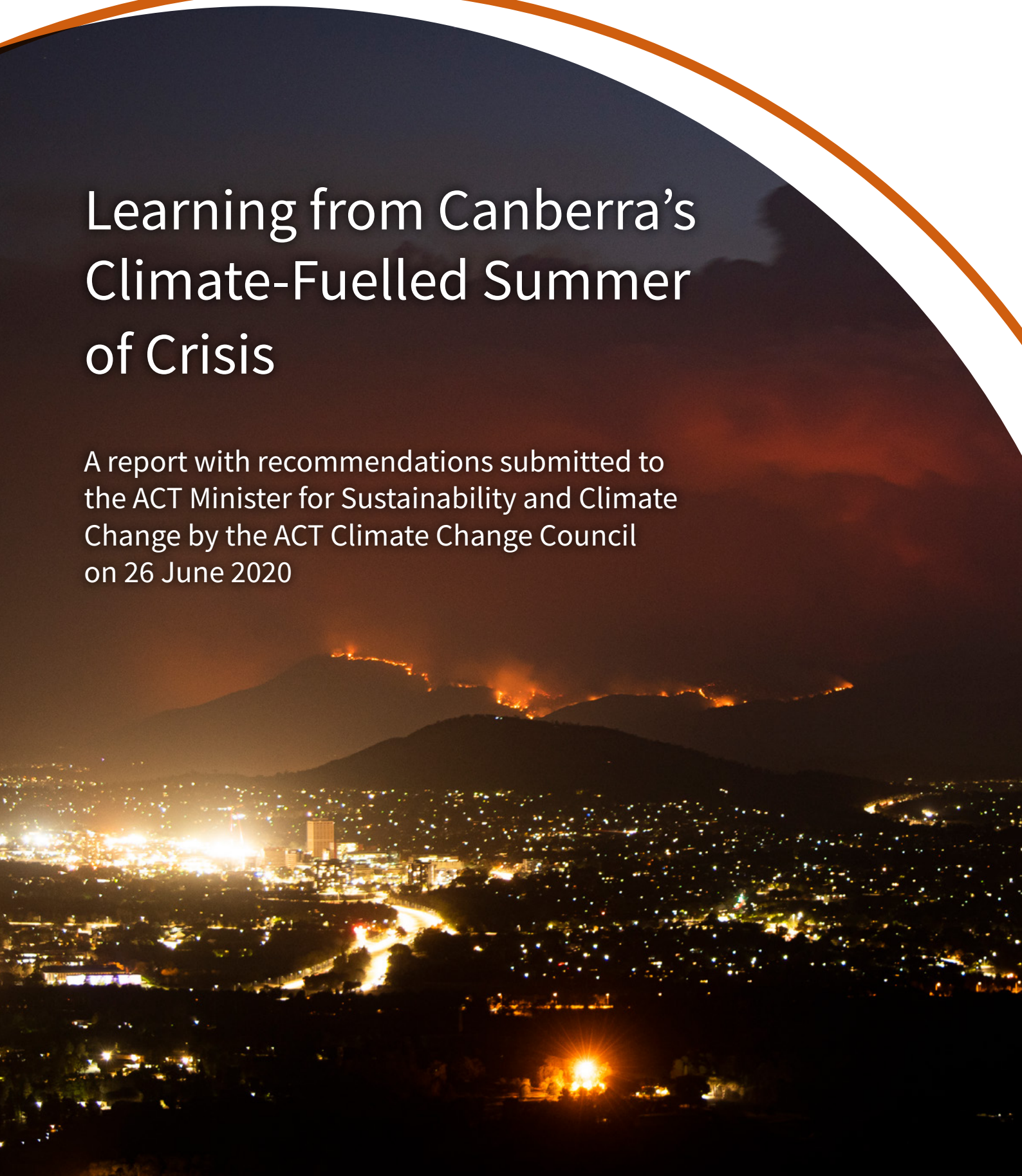
ACT Climate Change Council

Learning from Canberra's Climate-Fuelled Summer of Crisis

A report with recommendations submitted to the ACT Minister for Sustainability and Climate Change by the ACT Climate Change Council on 26 June 2020



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Learning from Canberra's Climate-Fuelled Summer of Crisis, ACT Climate Change Council (2020).

ACKNOWLEDGMENT OF COUNTRY

Council wishes to acknowledge the traditional custodians of the land on which we meet, work and live, the Ngunnawal people. We acknowledge and respect their continuing culture and the contribution they make to the life of this city and this region.

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“Healing is best understood as a long-term process.

This process is something that an individual or group of people embark on willingly and purposefully.

It is a process committed to identifying the root causes and addressing these through appropriate strategies and practices.”

Bhiamie Williamson
Centre for Aboriginal Economic Policy Research
Australian National University

Learning from Canberra’s Climate-Fuelled Summer of Crisis is a report submitted to the ACT Minister for Sustainability and Climate Change on 26 June 2020 by the ACT Climate Change Council, whose members, listed below, endorse its contents.

Dr Paul Bannister

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Executive Summary and Recommendations

A little over a year ago, in May 2019, the Australian Capital Territory (ACT) recognised a state of 'Climate Emergency' that requires urgent action across all levels of Government and commits the Territory to "national and international leadership on climate change.[1]" Seemingly on cue, the horrific summer of 2019-20 has clearly underlined the stark reality that global heating is already directly impacting the quality and security of life in the ACT.

The ACT Climate Change Council has prepared this report to assist the ACT Government in learning from the trials of fire, smoke and hail that defined summer 2019-20 in order to better prepare for the climate-driven emergencies that will come ever more frequently in the future. In preparing this report, we have drawn upon the results of three community consultation workshops with Canberra residents, extensive consultation with experts across a wide range of disciplines, and the expertise of Council members.

We have made a wide range of specific recommendations that we believe will assist the ACT Government in responding to the ongoing impacts of global heating, both in the long term and in relation to the short-term crises it provokes. Recommendations cover a wide range of policy areas, reflecting the wide range of material, social, health and environmental effects that were demonstrated this past summer.

We do not pretend that this report is comprehensive, but unless we couple this learning with the immediate actions required to limit further global heating, we run the real risk of creating a world for which adaptation will no longer be possible. Consequently, the recommendations of this report should be read as measures that complement the strong, rapid greenhouse gas reduction strategy already in place. In this manner, the Council believes that the ACT can, and should, be a national leader in both mitigation of and adaptation to climate change.

The Council acknowledges that some of our recommendations may already be the subject of current study or intended policy by the ACT government. Where this is the case, our recommendation should be seen as strong support for effective action to speed the outcome.

Specific Recommendations

1 THE PATHWAY TO HEALING

A. The ACT government should meet with CEOs of community organisations to discuss what increased support they may require to best support the community to achieve effective climate adaptation and resilience in climate crises.

B. The ACT government should work with business to develop a coordinated response approach for future crises in order to minimise economic and resultant social impacts.

C. In consultation with the community, the ACT government should develop strategies that enable citizens to contribute in the preparedness and recovery process after disaster, such as the 2019-2020 bushfires.

2 COMMUNICATION

A. An emergency information 'dashboard' should be launched, integrating nearly real-time information from different platforms about crisis-initiated road closures, approaching storm cells, predicted changes in smoke conditions, fire threats, heat stress and other hazards. The dashboard should include contextual information about appropriate response options and use push technology (via text message and social media).

B. The ACT Government should support the creation of a long-term strategy for the provision of independent, factual and apolitical information on climate change and related issues to ensure that its climate change policies continue to be contextualised in the minds of the population as a response to the broader on-going climate crisis. Expertise, independence and clear communication skills will be essential.

3 NATURAL HABITAT

A. A natural landscape inventory should be compiled (and frequently updated) to understand the current status of ecosystems and habitats through the ACT. This should include identification of fire status, environmental stress, weed invasion and dieback.

B. A plan for the rapid and directed diversification of the landscape should be developed, aiming to produce a mosaic of different environments each best suited to the situation but as a whole providing the ecological diversity needed to support a healthy ecosystem as a whole.

C. Each mosaic piece should be subject to its own restoration plan. This plan should include:

   I. Active planting of species appropriate to the site;

   II. The selective promotion of large tree growth and of appropriate plants;

   III. The strategic reintroduction of large woody debris and standing dead trees for habitat and shelter

   IV. A site-specific fire risk management regime using an integrated strategy of targeted hazard reduction burning, mechanical or other hazard forms of reduction, and habitat modification techniques as appropriate to the mosaic piece restoration plan.

   V. Community involvement, both Indigenous and non-Indigenous, in the restoration of individual mosaic pieces as a key opportunity for community building, civic pride and post-COVID economic stimulus.

D. Provisions should be made to exclude or contain fire from recently-burnt areas, including providing for rapid attack and quick access.

E. In order to support the above process, a comprehensive seed bank should be developed and used to foster the regeneration of species endangered by the increased incidence and severity of fires.

4 URBAN CANOPY

A. The ACT's goal of 30% green canopy should, as far as possible, be enacted with an emphasis on ensuring that there is equity of access between old suburbs and new suburbs.

B. Street and park trees that are removed because they have exceeded their useful or safe life should be repurposed or used for their highest value rather than entering the waste stream.

C. New planting and replacement planting must consider the harsher environment likely to occur in future, ensuring that species choices and surrounding infrastructure, especially soil permeability and water access, are appropriate.

D. The implementation of the Living Infrastructure Strategy needs to be supported by improved communication of how the strategy works and the logic for local decisions in order to increase public understanding and engagement.

E. Regulations that inhibit the addition of roof and vertical gardens should be minimised.

F. Funds should be established for the maintenance of tree canopy, and roof or vertical gardens in new developments.

5 BUILT ENVIRONMENT

A. The ACT government's proposed minimum rental standards should include coverage of insulation (both bulk insulation and glazing performance) and building sealing and may also need to consider the adequacy of heating and cooling equipment.

B. The ACT government should conduct an active program to upgrade the energy efficiency and resilience of existing commercial, institutional and residential buildings, including those within its own portfolio such as schools and health facilities.

C. The ACT should introduce a best-practice National Construction Code Compliance scheme in order to improve building quality and community confidence in the built environment.

D. The ACT should review the implementation of its own climate and sustainability strategies from a whole of government perspective to ensure that barriers to compliance are removed.

E. A number of sites should be chosen as crisis refuges. These sites should be capable of providing refuge from extreme heat events and be upgraded so as to be able to install HEPA filters during periods of poor air quality to provide refuge from smoke. The community should be made aware of these refuges well ahead of an approaching crisis.

F. The ACT government should develop an integrated water management strategy that combines supply and demand side options and integrates with other key strategies across ACT government portfolios.

Relationship to Wellbeing Framework and Implementation of this Report

In the table below, the report's recommendations (indicated by numbers in the top row) are cross-referenced to each of the domains in the ACT's Wellbeing Framework[2] (shown in the leftmost column). This demonstrates the whole-of-government nature of the crisis we face.

To meet this challenge, we further recommend that as part of an implementation plan for the specific recommendations of this report, as well as an integral response to the on-going climate crisis, the ACT government should formalise and empower a high-level cross-portfolio team dedicated to considering the climate adaptation and mitigation consequences of all future decisions.

Table 1. The overlap between the recommendations of this report (columns) and the domains of the ACT Wellbeing Framework (rows) are indicated

	PATHWAY TO HEALING	COMMUNICATION	NATURAL HABITAT	URBAN CANOPY	BUILT INFRASTRUCTURE
Health	YES	YES	YES	YES	YES
Safety	YES	YES	YES	YES	YES
Living Standards	YES	NO	YES	YES	YES
Housing and Home	YES	NO	YES	YES	YES
Environment and Climate	YES	YES	YES	YES	YES
Social Connection	YES	YES	NO	NO	YES
Education & Lifelong Learning	YES	YES	YES	YES	YES
Time	NO	YES	NO	YES	NO
Identity and Belonging	YES	YES	YES	NO	YES
Governance and Institutions	YES	YES	NO	YES	YES
Access and Connectivity	YES	YES	YES	YES	YES
Economy	YES	YES	YES	YES	YES

Introduction and Motivation

The summer of 2019-20 was unprecedented in many ways for Australia, and for its capital city, Canberra, in the ACT.

Fuelled in part by record-breaking heat and drought, the 2019-20 bushfire season was the worst on record for New South Wales (NSW) in terms of the scale of the bushfires, the number of properties lost, and the size of area burned[3]. In many aspects, the fires fell outside of what might be considered "normal".[4] Nearly all Australians, about 80% according to one published study[5], were affected in one way or another. At least 1 billion animals perished, 800 million in NSW alone[6].

The ACT Climate Change Council[7] (the Council) met twice in early January 2020 to discuss how its remit was related to this local emergency. As extreme weather in general (and the 2019-20 Australian bushfire season particularly[8]), is substantially fuelled by worsening climate change, the Council undertook to study the summer of 2019-20 through the experiences of Canberran citizens and the expertise of various discipline specialists. The goal was to learn from this horrific summer in ways that can improve preparedness to both anticipated and unanticipated future climate-related shocks.

Council held three community conversations in March 2020, one each in south, central and north Canberra. The sessions began with brief individual written responses to set questions, followed by open community in-the-round discussions. The outcomes are summarised in Community Listening Report on Adaptation to Climate Crises: The Extreme Summer of 2019-20 [9] (see Appendix). Augmenting this was an analysis of a brief questionnaire answered by over 20 academics, practitioners and public servants, with expertise covering climate science, community and services, natural and planned environment, health, equity, indigenous experience, and city services.

The Council would like to express our deep gratitude to all those who provided input to inform this report, including:

- Private citizens who shared their views and experiences,
- Discipline specialists and practitioners who responded to our questionnaire (as listed in Table 2 below),
- Other experts and specialists involved in the preparation of this report.

Whilst we take complete responsibility for the contents and recommendations of this report, the richness of detail in it reflects the engagement of a much larger part of the ACT community.

Table 2. Discipline specialists and practitioners who contributed to the findings of this report.

NAME	ORGANISATION
Wally Bell	Ngunawal Traditional Custodian, Chair Buru Ngunawal Aboriginal Corporation
Geoff Buchanan	Australian Council of Social Service
Michael Doherty	Fenner School of Environment and Society, ANU
Chris Glennon	Environment, Planning and Sustainable Development Directorate, ACT Government
Dr Tjanara Goreng Goreng	Centre for Aboriginal Economic Policy Research, ANU
Prof Lesley Hughes	Pro Vice-Chancellor (Research Integrity and Development), Macquarie University
Dr Arnagretta Hunter	ANU Medical School
Jennifer Kirkaldy	The Salvation Army, Australia
Dr Margaret Kitchin	Interim Commissioner for Sustainability and the Environment, ACT Government
Romy Listo	School of Social Science, University of Queensland
Michelle McGaurr	Homelessness Services, Housing ACT, ACT Government
Beth Mitchell	Education Directorate, ACT Government
Adrian Piani	ACT Chief Engineer, ACT Government
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Mr Bhiamie Williamson	Centre for Aboriginal Economic Policy Research, ANU
Howard Wren	ACT Emergency Services Agency - ACT Ambulance Service
Denis Wilson	Chief Minister, Treasury and Economic Development Directorate, ACT Government

The Unprecedented Summer 2019-20: Links to Climate Change

Ringed by fires in NSW and later the ACT for much of the 2019-20 season, Canberra experienced extreme and long-lasting periods of appalling air quality due to smoke. On New Year's Day, Canberra's air quality was the worst of any city in the world, at least 23 times the threshold considered to be hazardous[10,11,12].
The prolonged smoke in the ACT often occurred at the same time as record breaking heat and the threat (or reality) of fire in the Territory itself.
On 2 January 2020, the ACT declared a state of alert that was extended and later upgraded to a state of emergency. Two days later, Canberra broke its 81-year temperature record with a maximum of 44°C [13].

Extreme weather of another sort followed on 20 January 2020 when Canberra experienced a severe hailstorm with golf ball-sized hail and high winds that resulted in a record number of calls to an already stressed ACT Emergency Services Agency – 1,900 in just 8 hours[14].

The conditions in Australia and in NSW/ACT were extreme: across Australia, 2019 was both the hottest year on record and the driest year on record. Unsurprisingly, this affected people's experience of drought, fires, smoke, water supply and demand, and other climate-driven issues. The circumstances in the ACT reflected this broader national setting, but with localised differences. Unfortunately, the experiences of the summer of 2019-20 align with the trajectory anticipated for future climate change.

Drought

Drought is a human construct with different criteria and thresholds depending on region, context and focus, for example whether one is considering water resources generally or agriculture specifically. Even within this variation in perspectives, the 2017-2019 drought is generally considered to be one of the three or four major Australian droughts since detailed records began. By some criteria it was the worst.

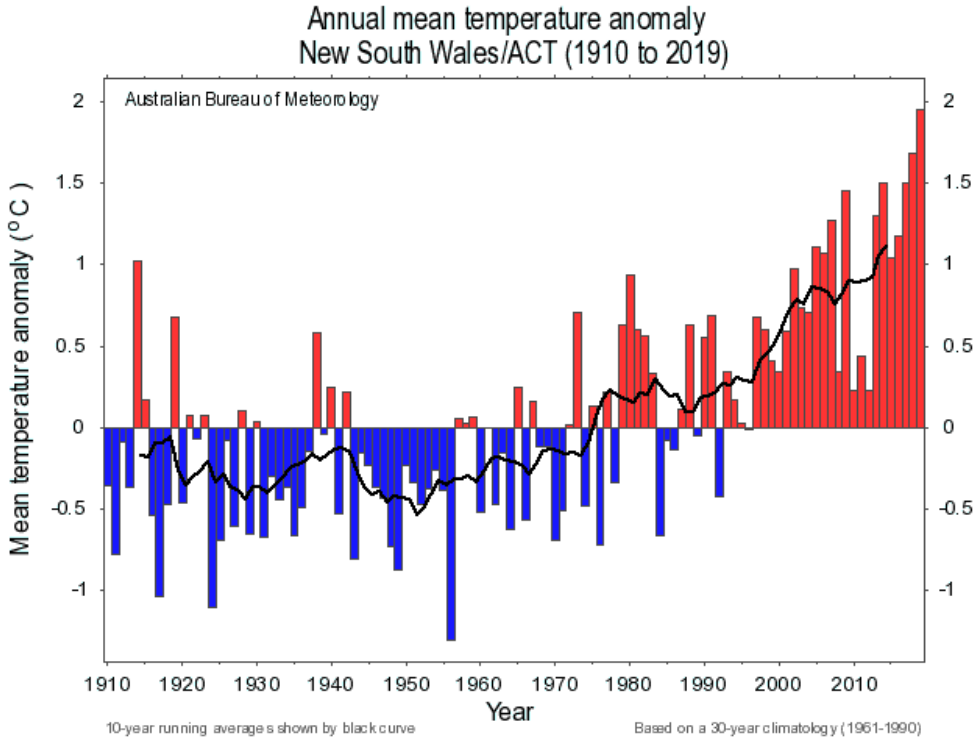
Broadly, drought depends on the relative water balance in the system of interest and hence is an integration of pre-existing conditions, plus inputs (such as rainfall) minus outputs (such as evaporation from soil). The pre-existing soil moisture conditions leading up to the summer of 2019-2020 were problematic due to the three very dry preceding winter seasons, which limited deep soil moisture levels, and a very dry spring in 2019, which meant that the upper soil was also dry[15]. Low precipitation (only 57% of the long-term average) high temperatures (about 2.5°C above the long-term average), and low humidity during the summer increased potential evaporation rates. What rain did fall evaporated quickly. Consequently, although Canberra's dams were nearly full at the start of 2017, the store declined steadily to only 46% capacity at the start of 2020[16]. The key driver of this drought was specific conditions in the Indian Ocean.

Climate change projections[17] are fairly consistent in showing cool season rainfall decreasing in our region, with further reductions in annual rainfall of about 7% by 2030 and 12% by 2050. In addition, increasing temperatures, a general reduction in relative humidity[18] are expected. Furthermore, the Indian Ocean conditions that drove this summer's drought are likely to increase in frequency with climate change. In combination, these are likely to increase drought risk in the future.

Heat

The summer of 2019-2020 was the third hottest on record in the ACT, being 2.5°C hotter than the 1961-1990 average, and daytime temperatures being particularly hot at 3.1°C above average. The hottest day reached 44.0°C on 4 January, which was a new record for the ACT. Average daytime temperatures for December and February were also the highest on record. The hottest night on record occurred on 2 February at 26.7°C. These conditions result in increased potential for human heat stress, especially when high night-time temperatures allow no relief from the heat.

The current strong trend towards higher temperatures is entirely consistent with longstanding understanding of physics and with the long, strong pattern of increased global emissions of greenhouse gases. Climate projections indicate an increase in average temperature for our region of 0.7°C by 2030 and 2.1°C by 2050[19]compared with the recent past (1990-2009). Our region is already experiencing surface warming greater than the global average, with the result that the number of heatwave days have doubled from 6 during 1950-80 to 13 during 1981-2011.[20]



Fire and Smoke

The key drivers of fire risk in southeast Australia are well established: drought conditions, high temperature, low humidity and strong winds. Drought conditions result in both leaf drop, which increases fuel loads, and dries out the fuel. In combination with high temperatures and low humidity, this promotes both ignition and faster fire spread. Many intense fires in southeast Australia are associated with strong winds drawn from the hot continental interior channelled ahead of powerful cold fronts. The winds behind the cold front are usually in a different direction and are highly turbulent, increasing risk and difficulty for fire fighters.

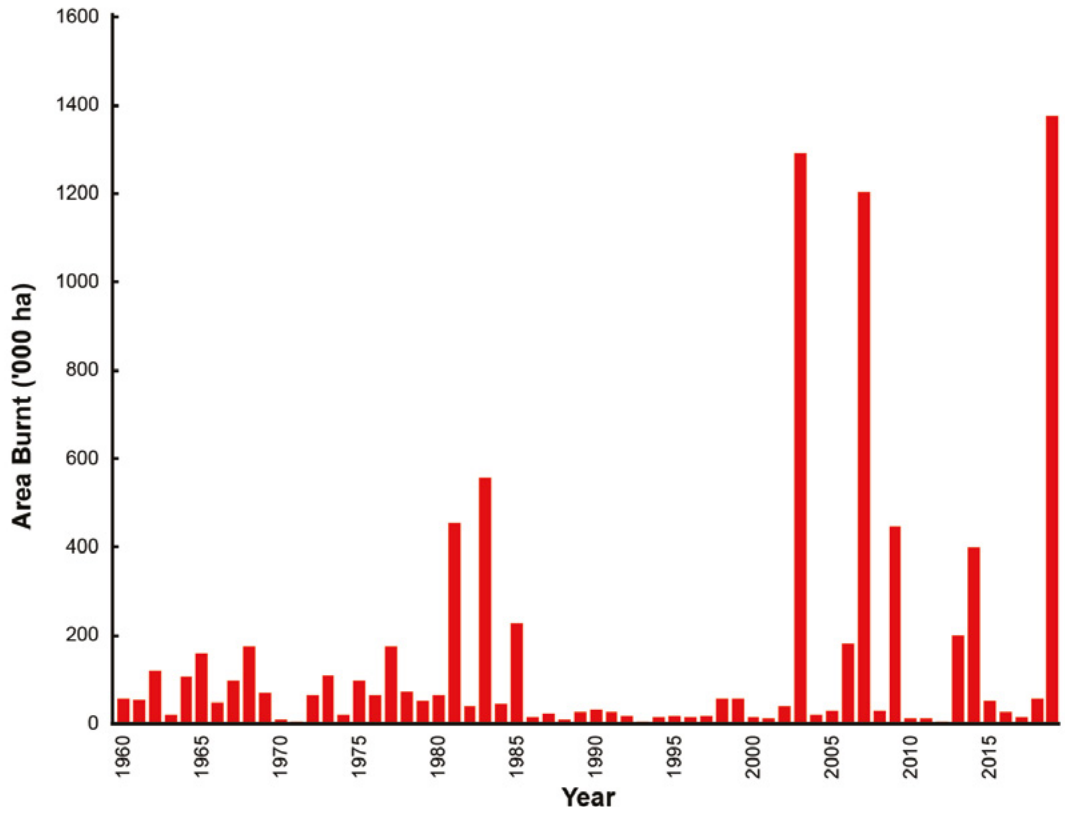
All of these factors came into play in the 2019-20 summer fires, resulting in an early start to the fire season, record levels of fire danger risk and specific conditions that resulted in fires across a record area in southeast Australia[21]. Some of these bushfires had major direct and indirect impacts on the ACT. Large fires in surrounding areas of New South Wales caused severe smoke pollution for much of December and January, whilst a fire in late January and early February burnt large areas of Namadgi National Park.

Unfortunately, these trends are projected to continue into the future globally[22] and in Australia,[23,24] with likely increases in the fire danger index, number of fire ignition days, rate of fire spread, fire season length and area burnt. Amongst other things, the frequency of the frontal systems that are associated with very severe fire risk is projected to increase by up to a factor of four by the end of this century, depending on the rate at which we reduce emissions[25].

The figure below shows the increase in area burned in Victoria from 1950 to 2020 has increased dramatically in the last 20 years.[26]

Violent Storms

Increased atmospheric temperatures increase the amount of water able to be held in the atmosphere and tend to increase the instability of the atmosphere. Longstanding scientific expectation is that the combination of these factors gives rise to increased storm intensity and frequency, increased rainfall intensity and, in some cases, increased hail risk. This expectation is borne out in a wide range of cases[27,28]. On the 20th of January, the ACT experienced one of the most severe hailstorms on record, with hail 4 to 6 cm in diameter falling across a broad region, causing extensive damage to buildings and motor vehicles, with estimated costs in excess of $500 million.[29]



Compounding Factors and Risks

These climate stresses do not occur in isolation. Drought, high temperatures and fires often co-occur as they are driven by related processes and often influence one other. For example, drought conditions increase temperatures as there is little cooling from the evaporation of water from soil and plants, and high temperatures tend to increase drought as they are related to lower humidity and higher solar radiation loads, which increase potential evaporation and reduce soil moisture. Similarly, high rainfall intensity and floods often co-occur.

Compounding factors are also responsible for Australia's drying rivers. The amount of run-off, that is the water available to feed dams and rivers, decreases markedly with the multiple effects of climate change. It is estimated that for every degree (°C) of global warming, runoff is reduced by 15% in our region[30], which is similar to what we are currently experiencing. With current emissions trends leading the world to a possible additional 2 °C to 3 °C of temperature increase, the ACT/NSW region could be faced with useable water reductions of 45-60%, compared to mid last century. This has profound consequences for water availability for human and environmental use.

At a societal level, economic impacts can also compound. Smoke and hail affected many businesses, with particular impact on the hospitality and tourism industry, while the construction industry had to choose between continuing work on sites at potential risk to employee health, or suspending work at risk to cashflow, profit and timelines. These industries are major employers at the lower income end of the jobs market, so their decisions disproportionately affect the poor, who are already more likely to suffer disproportionate impacts on health and quality of life from the direct impacts of the crisis.

And, as demonstrated by the summer of 2019-20, the stress on emergency response, health and other systems can be magnified when other stressors, such as those associated with the COVID-19 pandemic, occur jointly or in close succession.

The most devastating risk is that some of Earth's subsystems (like Arctic sea ice, ocean circulation, the Amazon rainforest, or coral reefs) will become unstable and "tip" irreversibly into new states that accelerate the effects of climate change. If they were to cascade in a domino effect, the result would be an unrecognisable landscape for current ecosystems and human civilisation. Some of these subsystems are already showing signs of becoming unstable, with "tipping points" could lie on our current trajectory of global heating of 3 °C to 4 °C above pre-industrial temperatures[31,32].

Impacts on Community and Health

Living through extreme, long-lasting weather events has affected the ACT community's connectivity, cohesiveness and social health.

Inequality

Canberrans who are at social and economic disadvantage are impacted disproportionately by climate change. Due to increased exposure to ill-effects, susceptibility to damage and decreased ability to recover from climate change damage, disadvantaged groups will feel an exacerbation of inequality and poverty[33]. Those with pre-existing health conditions, children under 14, the elderly and pregnant women were identified as the most vulnerable during this period[34].

According to the ACT Council of Social Service (ACTCOSS)[35],

- Almost 40,000 people live in households that are among Australia's most disadvantaged
- Over 37,000 people live in low-income households, including almost 8,000 children
- Almost 26,000 people are living below the poverty line
- Over 25,000 people in low-income households are experiencing food stress
- Around 43% of low-income rental households are in rental stress
- There are little or no affordable and appropriate private rental properties for young people supported by Youth Allowance, or people receiving Newstart Allowance, Disability Support Pension, or Parenting Payment (single).

The 2018 ACT Longitudinal Survey on Climate Change showed that the groups most vulnerable to the impacts of climate change were "renters, younger people, and those living in units/apartments – particularly including women, people born overseas, and those with a low level of formal education[36]."

Particular examples of how the vulnerable were disproportionately affected by the events of the summer 2019-20 include:

- Public and private housing tenants had to cope with the dual problems of living in typically lower standard homes that provide less shelter from heat and smoke and the inability to undertake or demand modifications to protect themselves.
- Many low-income households, even where they own their own house, were similarly unable to make the modifications needed to protect themselves from heat and smoke due to lack of disposable income. Those with limited mobility were double affected, being often both poor and unable to undertake even basic work on their homes due to their physical limitations.
- People on lower incomes were more likely to be affected at work by the crisis:
  - Many low-income jobs involve outdoor work, exposing employees to smoke and heat
  - Many in low income jobs have little job flexibility or security and so were unable to miss work in order to defend property from looming fire threat or protect themselves from smoke.
- Poorer people were more likely to be underinsured or uninsured, and so suffered greater loss from the hailstorm, and would have suffered greater loss had homes in the ACT been impacted by fire.

The homeless were particularly affected by smoke and heat[37]. Many sought shelter in libraries and shopping malls when they were open. While homeless services handed out personal protection equipment (PPE), eye drops and bottled water, the extreme heat and haze meant that volunteers had a reduced capacity to carry out these activities.

Physical Health

Physical health is critical for our overall wellbeing, and can be affected by lifestyle, diet, behaviour and our environment. The poor air quality experienced by the ACT in the summer 2019-20 directly impairs physical health[38,39]. The ACT Health Directorate advised Canberrans to minimise levels of prolonged or heavy physical activity outdoors[40]. The need to reduce time outdoors affected many in our community, including but not limited to those taking part in professional and recreational sport activities, occupations that require working outdoors, and the course of normal community events/or activities and family/individual leisure time.

The overall excess mortality in Canberra attributed to the 2019-20 summer bushfires due to smoke has been estimated to be 31 deaths[41], and Australia-wide the 2019-20 bushfire season was significantly more deadly than COVID-19 to date.

Health infrastructure was also severely tested by this climate-fuelled summer. The majority of wards in Canberra Hospital were filled with unhealthy levels of smoke, which also caused combined with the heat caused MRI and CT scanners to fail and contaminated what would have otherwise been sterile equipment[42]. The air-conditioning systems of the hospital are not designed to cope with poor outdoor air quality.

Canberra Hospital documents report that there were 166 “smoke-related” presentations to the emergency department between 20 December 2019 and 12 January 2020[43]. Although numbers are not yet available, it is likely that many more presented to general practitioners.

The general effects of heatwaves, particularly hot nights, are well-documented to cause increased mortality,[44,45] but these may be an underestimate as heat is rarely identified as a cause or a contributor to death on death certificates[46]. The effects of bushfire smoke, especially long-term effects of prolonged exposure are less well-known. Nevertheless, the fine particulate matter (PM2.5) of bushfire smoke, which can enter the bloodstream, has been associated with exacerbations of lung diseases such as asthma and chronic obstructive pulmonary disease, as well as heart attacks, strokes, pre-term birth and deep vein thrombosis[47,48,49]. The 2019-20 bushfire smoke exposure of millions of Australians is unprecedented in its combined severity and duration, and adverse, unexpected, long-term effects may be revealed by the passage of time.

Mental Health

During the extended periods of heat and smoke, Canberrans remained in their homes for longer periods of time, reducing opportunities to enjoy outdoor spaces and to come together as a community. Canberrans reported feeling a sense of loss, even sorrow, associated with this disconnect with nature and community. Disconnection from nature has been shown to cause significant issues for humans, including a decline in psychological health[50].

It is not uncommon for communities to feel a range of feelings when experiencing dramatic events such as bushfires, which can cause not only physical harm, but also mental trauma[51]. Each of us react differently to trauma, but some experience severe reactions, causing them to feel overwhelmed, numb, detached, or have reduced focus and/or sleep disturbances. Some will constantly question and 'replay' the event in their minds, inventing different outcomes in the desire to be prepared should it happen again. Still others will maintain fear for no obvious reason or lose a sense of hope or interest in the future[52,53].

The decision to reduce staff hours or to close business during this time would have brought economic challenges to those involved.[54] The flow-on impacts of reduced hours or loss of employment can cause financial stress for individuals and their families. It can also impact health, causing anxiety or depression and placing strain on relationships.[55] Raised stress levels can unsettle the family unit, and in some cases can increase the potential for family violence.

Concerns were raised during Council's community consultations about the incidence of domestic violence rising during the smoke haze, especially given the decreased of ability to leave violent home situations. There is a great deal of research regarding factors that provoke family violence, but at the time of this report there is no direct evidence that impacts of the Canberra bushfire season of 2019-20 are related family violence. Due to current COVID-19 restrictions this evidence may take some time to surface. Nevertheless, there is evidence that the Victorian Black Saturday bushfires[56] and the current COVID-19 crisis[57] contributed to spikes in domestic violence. This should be a matter for research with an eye to learn how to protect potential victims in future crises.

Social trauma and social health

Collective trauma arises "when an unexpected event damages the ties that bind community members together[58]." The ongoing spate of disasters in 2019-20 – dense smoke hazes, bushfire threats, hail storm and a global pandemic generated collective trauma in the ACT. This was further compounded by witnessing our NSW neighbours experience the devastating bushfires more directly, and our deep affiliation with the devastated Snowy Mountains and southeast coast.

There is a "close relationship between people's health and the living and working conditions that form their social environment" [59]. Disasters leading to collective trauma can impact social health through:

- re-prioritisation and distribution of public monies and restructuring of systems,
- the overwhelming of health services, facilities, resources, and staff,
- increase in ailments, for example from polluted air,[60]
- increase in drug use due to inability to cope,[61]
- neglect of pre-existing ailments and avoidance of health facilities, and
- changed work and employment conditions that affect health equity[62].

Such collective trauma has likely affected social cohesion adversely in the ACT through:

- **loss of lives** – relatives, neighbours, community members, those we consider frontline heroes;
- **disruption to livelihood and income** – temporary or permanent closure of businesses and workplaces, loss of jobs or property, navigating an unfamiliar and changing social services system, the associated stigma of accepting charity or potentially starting over;
- **disruption to community life**[63] – remaining at home, working and schooling from home, closure of social groups, more time indoors, out of routine;
- **degradation to quality of life**[64] – restricted liberties, restrictions on services and resources, not covered by insurance, health issues;
- **social disconnection** – social isolation, family members gravitate together to exclusion of others, increased racial discrimination, shutting down due to being overwhelmed by the situation and barrage of social messaging, wading through (sometimes conflicting) information, new-found reliance on IT, feeling helpless;
- **loss of social identity** – trying to pre-empt what our local and wider society may become or what may be lost, introduction to 'new ways of being';
- **degradation to our environment** – devastated flora, destroyed and injured wildlife, closure of national parks; and
- **sense of unknown** – unknown repercussions, unknown length of threat, difficulty making decisions and planning, not feeling safe or secure.

The Path to Healing 1: Community Resilience

From an Indigenous perspective[65], healing is a long-term process that is undertaken purposefully, with the commitment to define and act on the root cause of the trauma. In the context of last summer's bushfire crises and the social trauma it caused, the implication would be that collective efforts in addressing climate change would promote community resilience and heal social trauma. Furthermore, many of the characteristics associated with community resilience, including strong social bonds and a connectedness based on shared history and cultural values, are commonly found in Indigenous communities that have borne repeated and numerous shocks. We might all seek to actively explore and learn from the resilience demonstrated by the first peoples of this continent.

According to the Australian Psychological Society,[66] spending time with people who care about us can offer reassurance and restore a sense of belonging. Rebuilding connections with family, friends, neighbours and a community support group are helpful steps towards recovery[67]. Canberrans have already shown strong social fusion and community spirit, by pulling together to support others in need. Examples include the Canberra Relief Centre for those interstate Australians affected by the bushfires, mutual aid networks[68], and other new pop-up benevolent community services and initiatives.

The Council's community consultations found that a connected community was extremely important to build resilience and adapt to changing environments. In particular, people desired to be more engaged and active in the community to help others during the crisis.

Both expert and community consultations suggested that formal community organisations were a crucial pillar in providing support. The Victorian Council of Social Service (VCOSS) has explicitly detailed the role of such organisations in supporting those who are affected by climate change[69]. In particular, VCOSS notes that community organisations:

- "provide critical health and social services, assisting before, during and after disasters and extreme weather events – linking people with their communities and the services they need;
- are uniquely placed to help people cope with change and stress, and to empower as they are embedded communities and understand their diversity, needs, strengths and vulnerabilities;
- together with other public service and advocacy organisations are best placed to engage groups of people who are vulnerable, provided they themselves are resilient, resourced and prepared."

According to the Australian Human Rights Commission[70], Australia rates well in terms of social cohesion when compared to other countries. The challenge lies in maintaining this during rapid social, economic and environmental change. In order to help communities to adapt and build climate resilience, increased support from government and community organisations will be extremely important. Recognising that community cohesion is critical to climate resilience, we recommend that the ACT Government formally engages with the CEOs of community organisations with a view to developing a community cohesion strategy. Such a strategy will help the ACT not only in the next acute crisis but also in its response to the long-term crisis of ongoing climate change.

The Path to Healing 2: Economic Resilience

The extended length of the smoke and haze, and the State of Alert and State of Emergency in the ACT had a significant impact on local businesses, although final financial figures are yet to be released. The tourism and hospitality industry in particular reported a sharp cut in visitors and revenue during the crucial summer period as people restricted any outdoor activities and many large public events were cancelled[71]. Businesses that were then hit by the hailstorm experienced further disturbance to trade, as well as the reputational damage to Canberra and its tourism attractiveness. In addition to adding to the stress of local business owners, the flow-on effects to affected employees were significant, resulting in disruption to income, schedules, and sense of identity.

The response of the business community to the events of last summer and more recently to COVID-19 demonstrates how business decisions affect the health and well being of society. Business leadership in a time of crisis is a key element of an overall crisis response but is often not considered in crisis strategies; furthermore, the adaptation and innovation of business in response to a crisis can turn disaster into opportunity. As part of this, there needs to be a high level of cooperation and problem -solving between government and business.

A Sectoral Example: Education and Research

Education is a major sector of the ACT economy and social fabric, with some 154,000 students at school, university or TAFE in addition to staff and ancillary services. The sector was heavily impacted by climate and other disruptions over the past several months. Dense and persistent smoke from surrounding bushfires resulted in the closure of University campuses during the first weeks in January and, with associated fire risks, resulted in disruption to teaching and research. The severe hailstorm of 20 January resulted in further closures and disruption to teaching and research along with major infrastructure damage.

The initial disruptions from heat, fire threat and smoke resulted in the implementation of existing response plans and the development of new ones to address the unforeseen nature of the situations. The cost implications of these are still emerging.

The events generated substantial new research into smoke and heat (especially health implications) and also fire (including fire monitoring and new rapid response systems) supported by a range of funding sources.

Importantly, the responses to smoke, fire threat and hail established a set of processes that enabled rapid and effective responses to the COVID-19 pandemic and shutdown. It also demonstrated the potential for compound risks (where more than one risk occurs at the same time). As a negative example, during the period of severe smoke haze, Canberra's Work Safety Commissioner warned building and business owners that they were required to monitor air quality for staff and to find alternative workplaces if required[72]. However, the Canberra Business Chamber stated however that there was no cut off between safe and unsafe working conditions and individual businesses need to make their own decisions[73]. This in contrast to the command-and-control decision making by governments in response to COVID-19. The optimum path almost certainly lies between these extremes.

To this end it is recommended that the ACT Government convenes meetings with the business community in order to plan out communication, consultation and actions in preparation for future crises.

The Path to Healing 3: Empowerment

A wealth of knowledge and skills exists within our community that is often overlooked or not considered by governments or experts during times of crisis. Government supporting self-help and strengthening community capacity have been shown to be important in successful recovery programs and providing the opportunity to build community resilience[74, 75, 76].

EMPOWERMENT

1. authority or power given to someone to do something
2. the process of becoming stronger and more confident, especially in controlling one's life and claiming one's rights.

During its consultations with community in March 2020, the Council heard repeatedly the desire by everyday citizens to be more actively involved during times of prolonged crisis, and to be given the means to contribute. Providing citizens with the structures and means to be more personal engaged in trying times would not only result in more human resources put to urgent tasks, but empower Canberrans to have more influence on the protection and recovery of their environment and their communities.

The Critical Role of Communication

Information is key to modern life and it was disturbing for many how quickly information systems failed under duress. While Canberra was fortunate to avoid the complete information losses that occurred in parts of NSW during the bushfires, the threatening bushfires and smoke did challenge the information systems used to inform the public. Key issues identified from the Council's community consultations were:

- **Road closures:** Information on the closure of roads was considered by many to be inadequate and not sufficiently timely. Consideration should be given to push-communication and other mechanisms to provide road closure information closer to real time.
- **Air quality:** Additional air quality monitoring stations should be implemented and hourly, unaveraged data reported. Forward forecast of impending changes in smoke conditions should be reported, even if only a few hours ahead.
- **Weather:** The intense storm cell that delivered the destructive January 20 hailstorm was visible on the Canberra weather radar some time before it hit. Again, consideration should be given to push-information systems that could provide advance warning – even at short notice – of such extreme weather conditions.
- **Emergency refuges:** While the reasons for the reluctance of ACT Emergency Services to advise the locations of emergency refuges well in advance are appreciated, the reality is that the public need to know this information well ahead a crisis so that they can incorporate their travel to the refuge into their plan. This is doubly important for those with limited mobility (i.e. without a car) such as home-carers with young children, the poor, the elderly, and those with illness or disability.

The Government should establish improved real-time and in-time communication strategies such as an emergency dashboard and push communication to mobile phones to assist residents in making the right decisions to protect life and property during quickly moving crises.

Irrespective of the above, the consultations revealed much positive community sentiment in relation to the clear leadership and regular information provided by Commissioner Whelan during the bushfire crisis. Her role, and the large number of operational emergency improvements made by the ACT government, contribute to the more favourable impression of the handling of the fires of 2019-20 compared to those in 2003.

Unfortunately, in both the bushfire and COVID-19 crises in Australia, a number of sources, including popular personalities, commentators and even some in the political sphere, released partial or conflicting information, simplistic solutions or even disinformation that disturbed or confused the public and complicated rational responses. Social media at times exacerbated the situation by speeding the dissemination of these remarks.

This contrasts with the calm, clear and authoritative information provided by Dr Norman Swan on ABC in relation to the COVID-19 pandemic. His regular updates across a range of media were seen as apolitical, evidence-based and practical, and attracted broad community appreciation and a large popular following. Such an independent and trusted communicator is vital to helping the broader community put disasters in context and plan for longer term consequences.

Based on these precedents, we believe that there is a strong argument that the ACT Government's Climate Change Strategy, and related strategies such as the Living Infrastructure Strategy, need to be supported by a long-term strategy of providing regular authoritative and independent communication on climate change issues. This will help inform and engage the population while also acting to counteract some of the many sources of misinformation in circulation.

Impacts on Environmental Health and Biodiversity

The living environment is a fundamental component of the ACT with its urban areas variously described as the Garden City or the Bush Capital, but most recently as the City in a Forest. Trees in the streets and parks were seen as essential components in the original design by the Griffins, particularly to "…ameliorate adverse environmental conditions like wind and dust as well as improve the barren landscape view[77]." The forested hills and surrounds were also an essential component of the city design to emphasise the symbolic cradling of the city in the Australian natural environment.

A diversity of tree species was used during the early development of the city landscape with the first urban foresters using the city as a vast arboretum to test the resilience and value of species in such a new environment.

The native forests and woodlands, both within the city environs as unplanted reserves and outside the urban boundaries as national parks, were allowed to largely passively regenerate after the extensive disturbance by grazing before the capital was established. By the beginning of this century, the ACT had inherited a complex living environment of over 700,000 planted trees – dominated by a few genera although including over 150 species - in the urban areas, surrounded by large areas of regrowth forests and woodlands of various conditions.

But long before the establishment of Canberra, and continuing to this day, Indigenous peoples have cared for the land, knowing at a very deep level that the land has cared for them. Their cultures are ingrained with knowledge that a resilient community is inseparable from a resilient landscape. With this perspective, environmental health cannot be compartmentalised – either in lived experience or policy – separate from human health, community, identity and belonging.

Urban and peri-urban natural environment

At the end of the 20th century, the ACT commissioned a census of the planted urban trees and concluded that the planted trees were on average healthy and surviving well[78]. These data were used to demonstrate that the urban trees were providing substantial benefits including mitigation of heat island effects and stormwater damage, carbon sequestration and energy use reduction[79, 80]. In addition to these benefits, researchers around the world have confirmed the benefits of trees for improving human health, supporting active transport and even economic activity[81, 82, 83, 84].

However, a review of measured trees in 2005 concluded that more Canberra streets trees than expected were showing signs of stress or poor health, which was likely to be the result of the Millennium Drought and reduced water availability[85]. Since some species planted in the 1900s showed significant problems in the increasingly harsh urban environment, it was recommended that these no longer be planted[86]. The continuing drought and higher than average temperature extremes caused extensive stretches of street and park trees to lose leaves, increase the number of dead branches in their crowns, or die[87].

Dead, dying or trees with relative few leaves do not provide the environmental or human health benefits associated with healthy trees. Availability of water for street and park plantings is a key requirement for the health of these trees and to maintain their ability to provide ongoing climate extreme mitigation, human health and economic value.

Although there is some public concern that urban street trees may present a fire hazard[88], it is generally concluded that street trees have a significant chance of catching fire only if there is sufficient ground litter or understory. This build-up of litter and understory[89] is extremely unlikely for urban streetscapes[90], and has not been mentioned as a potential problem by relevant experts. However, extended droughts and water stress may cause a build-up of dead leaves both on the ground and within the tree canopy, and this may increase the possibility of fires in parks that are not regularly mown or “cleaned up.” Street and park trees that are removed because they have exceeded their useful or safe life should be repurposed or used for their highest value and not enter the waste stream[91].

Green canopy cover

ACT's green canopy is a highly valuable resource, as well as a key measure for the reduction of urban heat island effects. The ACT Living Infrastructure Strategy[92] plays a key role in this maintaining this public benefit. However, Council consultations identified some concerns with respect to the implementation of the strategy.

The clearing of large areas for new suburbs and developments, and the subsequent years of seeming treelessness for these suburbs, creates a loss of amenity to those inhabiting these new developments. Green space at other locations in the urban area does not offset this loss in local amenity or provide the local cooling related to health and energy savings.

The clearing of land for developments and the loss of trees to drought and aging creates a perception amongst some in the community that the tree cover is decreasing rather than increasing, potentially undermining the credibility of the ACT Government's commitment to increasing green canopy. At a more detailed level, decisions around species selection and location are not well understood by the community. Stronger ongoing communication strategies that show how the Strategy is being implemented would add significantly to public understanding and appreciation of existing efforts.

While the Living Infrastructure Strategy plan to increase tree canopy cover to 30% is applauded, it is important that the trees are placed where residents can gain the maximum value in heat mitigation, promotion of active transport, aesthetics and health, especially for those whose mobility is limited. Many canopy benefits are spatially limited, for example the cooling effect of tree shade is restricted to the areas within close proximity to the tree (especially to the south and east of the tree).

Suburbs that fall well below the 30% threshold should not be excluded from activities to increase their cover because other suburbs exceed the threshold. In particular, trees removed during new construction or urban densification should not be simply offset by plantings or even restoration of more remote woodlands or secondary grasslands. New developments can be designed to incorporate living infrastructure within their development boundaries by including appropriate tree species, roof gardens, and vertical green structures. Offset planting could be used when these options are insufficient to meeting the canopy guidelines, but these offsets should be promoted to be within the urban area for maximum climate mitigation and health benefits.

In order to ensure that the intent of increasing green canopy is realised, perverse regulations that limit roof gardens and vertical green structures (such as considering roof gardens as an extra story that is subject to restrictive building height regulations) should be eliminated. Furthermore, where roof gardens or vertical green structures contribute towards the canopy area goals in a new development, an appropriate fund should be established to ensure maintenance for a period of, say, not less than five years.

Natural Landscape

Natural landscapes, including the unmown reserves and parks within Canberra and the surrounding Namadgi National Park, have also been stressed by the Millennium Drought as well as the more recent drought and above average temperatures. In addition, the 2003 fires burnt extensive areas of the national park; these were still in the process of recovering when they were extensively re-burnt in the 2019-20 fires. This represents a fire return time that is more frequent that the fire regimes normally experienced in this area. Such a rapid change in fire return frequency will significantly impact species survival. In particular, species that rely on seeds to regenerate, like Australia's iconic snow gums, mountain and alpine ash, may become locally extinct or at least endangered by the 2019-20 fires because the trees that regenerated from the 2003 fires were not mature enough to produce needed seeds[93].

Even without fire, changes in species are occurring as currently indigenous species become less able to cope with the harsher moisture and temperature regimes, causing new species to move in to fill the void. At a small scale, these changes are demonstrated on Black Mountain Nature Reserve as increased mortality of red stringybark trees is observed even as cypress pine trees, not observed in significant numbers prior to 1990, increase in number. Species changes or succession can also change resilience to climate change and other disturbances. Cypress pine trees, for example, can maintain a canopy down to ground level which means they are more likely to suffer a crown fire than the red stringybark trees they replace. Similarly, a much more frequent fire regime will result if trees are replaced by shrubs or grasses.

Stressed trees can also become more susceptible to insect or other pathogens, which can lead to large scale dieback[94]. Large patches of dead river red gums, ribbon gums and other trees have already been identified in the reserves and parks around Canberra, although formal declarations of dieback have not yet been made.

Wildlife and habitats

Although it is widely accepted that many Australian species evolved in the presence of fire and other disturbance regimes, not all disturbance is beneficial[95]. Changes in the patterns of fire disturbance, including the frequency, intensity and seasonality, can have disproportionate effects on wildlife and their essential habitat. Fires that are unusually hot or happening in unusual seasons, or even cool fires happening at unusual frequencies and seasons, can destroy critical habitat and make breeding success unlikely[96].

Essential wildlife habitats are composed of a diversity of structural and other environmental elements[97], which change over time due to disturbance, changes in moisture and site quality. Some structural elements are more common in young stands (for example, regeneration and nectar rich shrubs), while other elements appear in older stands (for example, coarse woody debris and large trees).

Some of these structural elements can be vital as refuges from fire or other environmental damage. Coarse woody debris, for example, modifies temperature and can be an effective heat shield as a fire passes overhead[98]. The richest biodiversity at a landscape level occurs where there is a diversity of stands at different stages of maturity and structural diversity[99]. Unfortunately, large, hot fires like those of 2003 and 2019-20 can result in a major decrease in the structural diversity of a landscape with consequent reduction in biodiversity. In management, large, contiguous and homogenous areas of disturbance, whether from high or low intensity fires, should be avoided to allow for a diversity of habitats and refuges.

With 40,000+ years of Aboriginal habitation and land management, it is fair to say that traditional Aboriginal practices of management – a deep and active knowledge of the land and the management of small patches of this land using the best available tools (often, but not exclusively, controlled burning) are a fundamental part of the ecosystem. This contrasts with the modern tendency for areas of bush and forest to be managed passively – leaving it alone to look after itself - denying the key role that 40,000 years of active land management has had in determining the nature of Australian ecosystems.

In responding to the need to recover from fire and the need to manage natural landscapes through ongoing climate change, it is essential to move to a modern active management regime that combines the knowledge-based, small scale management inherent in traditional Aboriginal practice with modern scientific and technological approaches. The endpoint of this management regime needs to be to transition the current heavily burned and, as a result, relatively homogenous landscape into a mosaic of habitats at different stages of regrowth and recovery. This involves the following key steps:

1. A natural landscape inventory should be compiled (and frequently updated) to understand the current statues of ecosystems and habitats through the ACT. This should include identification of fire status, environmental stress, weed invasion and dieback.
2. A plan for the rapid and directed diversification of the landscape should be developed, aiming to produce a mosaic of different environments each best suited to the situation but as a whole providing the ecological diversity needed to support a healthy ecosystem as a whole.
3. Each mosaic piece should be subject to its own restoration plan. This plan should include:
    i. Active planting of species appropriate to the site;
    ii. The selective promotion of large tree growth and of appropriate plants;
    iii. The strategic reintroduction of large woody debris and standing dead trees for habitat and shelter;
    iv. A site specific fire risk management regime using an integrated strategy of targeted hazard reduction burning, mechanical or other hazard forms of reduction, and habitat modification techniques as appropriate to the mosaic piece restoration plan; and
    v. Community involvement, both Indigenous and non-Indigenous, in the restoration of individual mosaic pieces as a key opportunity for community building, civic pride and post-COVID economic stimulus.
4. Provisions should be made to exclude or contain fire from recently-burnt areas, including providing for rapid attack and quick access.
5. In order to support the above process, a comprehensive seed bank should be developed and used to foster the regeneration of species endangered by the increased incidence and severity of fires.

A starting point for this process is the engagement with the Indigenous people of the ACT and surrounding area to develop a plan that draws on their unique knowledge and linkage to the landscape. Ongoing Indigenous involvement in landscape custodianship will also achieve significant social and equality goals and help grow respect and understanding in the broader community for Indigenous values and expertise.

Impacts on Built Infrastructure and City Function

As city dwellers, most Canberrans are used to being protected from the more challenging aspects of our environment by a safe built environment and a pleasant urban environment. However, the events of the 2019-20 summer brought home not only how exposed we all actually are, but also highlighted that many of us live in poor conditions even under normal circumstances. Indeed, more than one-third (39.4%) of the adult population of the region have low resilience to extreme weather events[100].

The ACT Government has control over the major parameters of the built infrastructure and city function, and thus can lead the way by taking measures that improve quality of life, resilience, health and social equality, while also addressing the underlying causal factor of climate change.

Building standards

Poorly insulated and poorly sealed buildings were both overheated and heavily impacted by smoke over this summer. The ACT has jurisdiction to set building standards exceeding those of the National Construction Code, with specific reference to energy efficiency and building sealing.

Compliance with regulations is also a significant issue. Poor compliance with existing building codes and standards is a national problem but one which can be tackled within the ACT through better compliance regimes. The ACT, due to its small size, is arguably better placed than larger jurisdictions to implement a stronger National Construction Code compliance regime.

The issue of compliance with ACT Government sustainably and greenhouse policies within government departments is similarly an issue. The Council has received evidence from stakeholders that these policies are not uniformly complied with, and that measures, for instance to eliminate natural gas use from the government property portfolio have been stymied by internal inertia and ACT Treasury resistance to solutions that are not lowest capital cost.

Low-income households and renters were particularly badly affected by the summer's combination of heat and smoke. Furthermore, the smoke disproportionately impacted those normally at home, thereby affecting the sick, women, young children and the elderly more than the rest of the population, along with those working outdoors. Middle class workers, by contrast, could hide from the smoke (to some extent) and heat in the comfort of air-conditioned buildings.

Access to affordable, climate resilient housing is an important feature for the lowering of inequality. Efforts are being focused in this area in the ACT Climate Change Strategy 2019-2025[101], the ACT Housing Strategy[102], and through the Energy Efficiency Improvement Scheme (EEIS)[103], but these need to be actively prioritised to enable just climate responses in the Territory.

As part of this, the ACT Government's proposed minimum rental standards should address and reward good building insulation quality (both bulk insulation and high-performance glazing) and building sealing, and furthermore may need to consider the adequacy of heating and cooling equipment. As the large bulk of the building stock, commercial, institutional and residential, was built to lower efficiency standards than today, there is a strong need for proactive policy to upgrade or replace buildings to acceptable energy efficiency and heat/smoke resilience standards.

Many of the ACT's own building assets performed poorly in the summer, with Canberra Hospital[104] and schools[105] significantly affected by smoke, as well as public housing[106]. Furthermore, feedback from Council consultations noted that the smoke affected the ability of many schools to maintain thermal comfort conditions. Refurbishment of public buildings to increase smoke resistance and improve building insulation will have benefits for health, education and productivity that potentially outweigh the value of energy savings manyfold.

For those with no or extremely poor shelter, or for those at particularly risk, consideration should be given to the identification and upgrade of a range of strategic buildings to act as refuges in smoke and heat events. These buildings should have the capacity to install HEPA-grade air filtration during smoke events, and well-maintained air-conditioning systems to operate during heatwaves. Refuge buildings could include public buildings such as libraries and public/private spaces such as shopping malls or places of worship.

Water delivery and quality

While the ACT Government's investments in water infrastructure after the 2000-2010 drought are recognised and appreciated in the community, there is significant concern as to what the future may hold in an increasingly hotter and drier climate with more fires. The Murray Darling Basin Authority predicts the basin will experience declining rainfall in the next decades and the IPCC predicts the runoff in south eastern Australia will drop by 15-20% per degree of warming[107]. This will have significant impacts on dam levels[108] and requires review and reconsideration of the ACT Water Strategy[109] which dates from 2014. Unfortunately, predicted impacts have generally increased as climate science has matured, making a 2014 strategy likely to be out of date.

To counter this very real threat, it is recommended that the ACT government develops an updated and integrated water management strategy that combines supply and demand side options, and integrates with other key strategies such as the Living Infrastructure Plan[110], Climate Change Strategy[111]. The City of Melbourne's Integrated Water Management Plan has been identified as a relevant precedent[112].

All Part of a Larger Whole

The Earth is a single, highly-connected and complex system of which humans are a part. Our actions can and have altered this system in ways that, in turn, affect our lives. Due to the interconnectivity, changes in one location or one subsystem of the Earth system affect all others, by varying amounts and on varying timescales. This has implications for how we, as Canberrans, adapt to climate change, and why working to reduce greenhouse emissions must be part of the overall plan.

World in transition: compounding crises

Due largely to the combustion of fossil fuels and the degradation and destruction of forests, the world is now hotter on average than any other time in the past 120,000 years[113]. Consequently, our current climate – not to mention the even hotter one we are headed toward – lies outside the experience of human civilisation.

Simultaneously, other characteristics of life, and the Earth that supports it, are altering drastically including: species extinction, rapid globalisation of disease, loss of fresh water resources, increase in chemical pollution and non-biodegradable waste[114, 115]. The majority of this change has happened within a single generation. One of the consequences of this accelerating change is that it is now more likely that crises occur simultaneously, or close enough in time that the recovery from one is not complete before the next has begun.

The summer of 2019-20 is a textbook case, with drought, followed by heatwaves, horrific fires, species loss, caustic smoke, devastating hailstorms and then – Covid-19. Some of these crises are directly related (fire and smoke), others indirectly (heatwaves and fire), and many are made more likely and intense for the same underlying reason: climate change. Effective response to the climate emergency in future will plan for compounded and cascading crises, rather than treating each as an isolated one-off event.

Holistic response: compounding benefits

One positive aspect of interconnected and simultaneous crises is that a systemic, holistic response can have benefits that are also interconnected and simultaneous. Here are just a few examples:

- Well-insulated, air tight buildings reduce
  1) risks due to poor outside air quality,
  2) effects of extremes in heat or cold,
  3) energy use and cost, and
  4) noise pollution.
- Improving community cohesiveness increases
  1) mental health,
  2) effective communication in an emergency, and
  3) recovery and resilience in a crisis.
- Healthy natural landscapes
  1) reduce urban heating,
  2) reduce species extinction, retain water,
  3) absorb greenhouse gas emissions, and
  4) increase public health.
- Identification and appropriate maintenance of large, dispersed community buildings can
  1) act as shelters against extremes in weather and air quality,
  2) generate power via solar systems with storage, and
  3) increase public cohesiveness.

Lessons from two Crises: Climate Change and COVID-19

Rapid learning and radical acceptance have been imposed on Australians by two major events in 2019-20: the climate-change fuelled extreme weather and the COVID-19 pandemic. The two crises differ with respect to the lead time of warnings, the speed of the most dire effects, the involvement of the ecosystem, and number of Australian deaths (with heat, smoke and direct fire deaths considerably higher than COVID-19 deaths). Nevertheless, several common lessons can be drawn from these two dramatic crises, lessons that should guide future response:

- The world is globally connected: naturally, socially and economically
- Preventative measures are more effective than treating the problem after-the-fact
- Acting quickly in crisis can avert future, even more catastrophic losses
- Advice from experts is crucial in designing effective responses
- True cooperation across political divisions and all levels of government results in better crisis response and recovery
- Actions of individuals matter greatly in protecting the health of us all
- Individuals and ecosystems with fewer resources or choices are more vulnerable
- Accurate and accessible information is key to effective and rapid response
- Carers, emergency personnel, and providers of basic services are crucial to societal health if appropriately resourced
- Some activities and industries can be permanently altered in ways that result in healthy adaptation rather than maintaining a risky status quo
- Trust, communication and flexibility are key to social resilience
- Our health and safety rely on the health of the Earth System.

Appendix: Community Listening Report on Adaptation to Climate Crises: The Extreme Summer of 2019-20

Introduction

The summer of 2019-20 was unprecedented in many ways for Australia, and for its capital city, Canberra, in the Australian Capital Territory (ACT).

Fuelled in part by record-breaking heat and drought, the 2019-20 bushfire season was the worst on record for New South Wales (NSW) in terms of the scale of the bushfires, the number of properties lost, and the amount of area burned[1]. In many aspects, the fires fell outside of what might be considered "normal"[2]. Nearly all Australians, about 80% according to one published study[3], were affected in one way or another. At least 1 billion animals perished, 800 million in NSW alone[4].

Ringed by NSW fires for much of the season, Canberra experienced extreme and long-lasting periods of appalling air quality due to smoke. On New Year's Day, Canberra's air quality was the worst of any city in the world, 23 times the threshold considered to be hazardous[5]. The prolonged smoke in the ACT was often contemporaneous with record breaking heat and the threat (or reality) of fire in the Territory itself. On 2 January 2020, the ACT declared a state of alert that was extended and later upgraded to a state of emergency. Extreme weather of another sort followed on 20 January 2020 when Canberra experienced a severe hailstorm with golf ball-sized hail and high winds that resulted in a record number of calls to an already stressed ACT Emergency Services Agency – 1,900 in just 8 hours[6].

The ACT Climate Change Council[7] met twice in early January 2020 to discuss how its remit was related to the local emergency. As extreme weather in general, including the 2019-20 Australian bushfire season particularly[8], is substantially fuelled by worsening climate change, the Council undertook to study the summer of 2019-20 through the experiences of Canberran citizens and the expertise of various discipline specialists. The goal is to learn from this horrific summer in ways that can improve preparedness to both anticipated and unanticipated future climate-related shocks.

Announcing its intent in the local newspaper[9] and via twitter and Facebook, the Council scheduled three community conversations, lasting from 7 to 9pm in each location.

- Tuggeranong Community Centre, 5 March 2020,
- Dickson College, 11 March 2020, and
- Palmerston Community Centre, 13 March 2020.

Participation was purely voluntary. Some contributions were received by email to the Council Secretariat at climatechangecouncilsecretariat@act.gov.au.
The sessions began with brief individual written responses to set questions, followed by open community in-the-round discussions. Altogether, about 50 Canberrans shared their experiences and views with the Council.
Notetakers recorded the discussions, and individual written comments were collected at the end of each evening.

Health, Well-being and Frame of Mind

Every community conversation described strong negative impacts of the 2019-20 summer on individual and community health, well-being, and frame of mind. These included:

- Fear, uncertainty, a sense of foreboding, trauma, feeling unsafe or that nowhere is safe.
- Feeling that climate change has arrived. “We thought we had more time.” World will not be the same.
- Anger and frustration at national inaction on climate change. Lack of clarity about ACT climate action and/or belief that it is being pursued strongly enough given declared “climate emergency.”
- Dread and panic of parents for babies and children affected and the new world they face.
- Feeling of isolation from others, cabin-fever, disconnect with nature, the sky, fresh air.
- Inability to take exercise due to the extended smoke and heat.
- Difficulty in caring for children who could not play outside and experienced smoke and heat even inside.
- Comparisons to the 2003 fires. Those in 2019-20 were longer and associated with more uncertainty.
- Deep traumatic sorrow about loss of wildlife, feeling that the bush will never be the same.
- Concern that the 2019-20 fires will be “forgotten” when summer has passed.
- Exhaustion and stress created by compounded crises.

Availability and Quality of Information

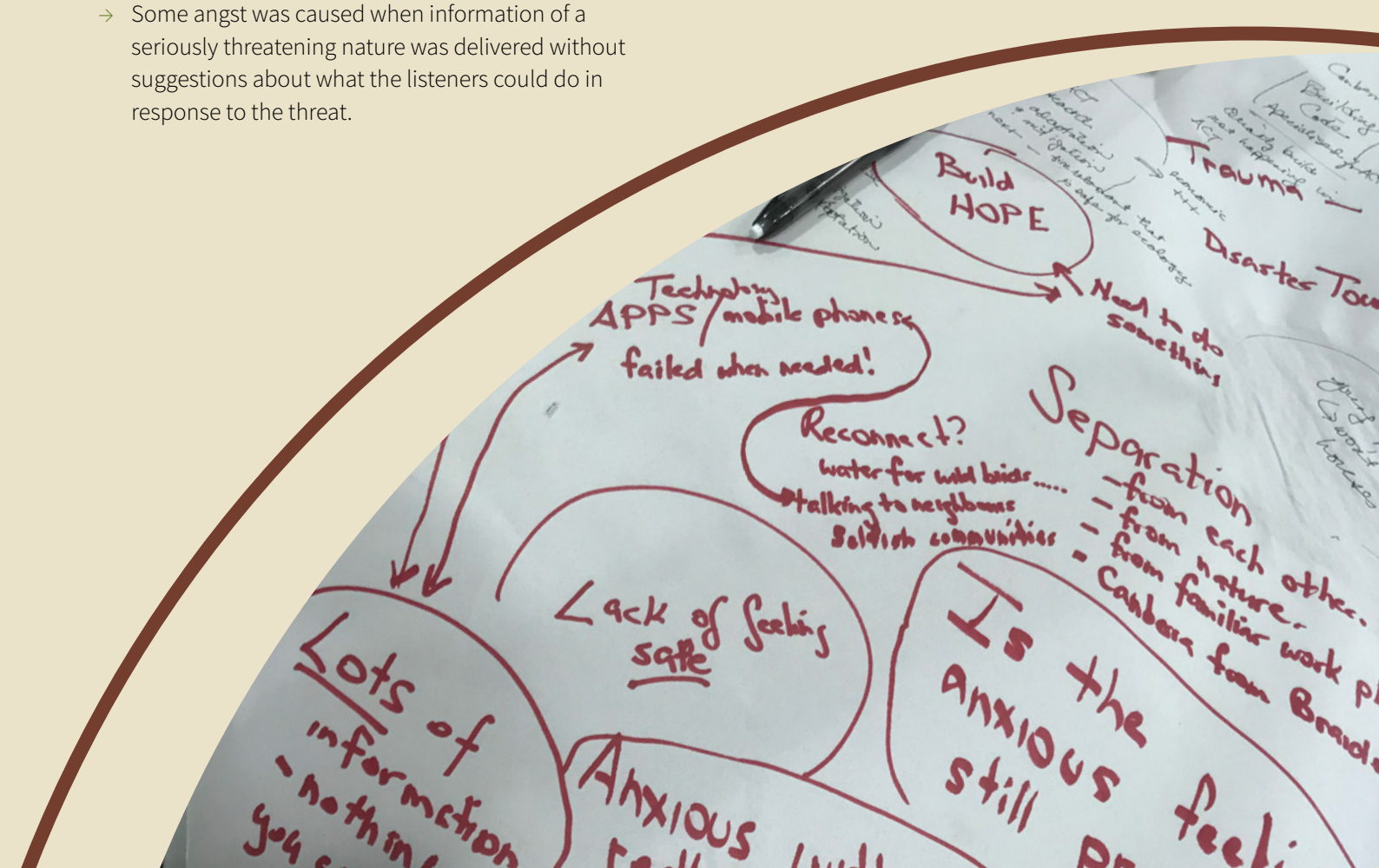
Access to immediate, high-quality and appropriate information was described as vital to making accurate decisions in a crisis, and reducing fear of the unknown. It was noted that:

- Vital internet and telephone communication were not always available (especially on the coast).
- The quality of fire information, maps, apps such as Fires Near Me, were considered quite improved compared to those available during Canberra fires of 2003.
- Smoke and air quality information, however, was often inadequate in terms of frequency and spatial resolution.
- Admiration and appreciation were expressed for the ACT ESA and Commissioner Whelan.
- Valuable first-hand citizen information could be better coordinated with RFS and ESA.
- A need for culturally/linguistically appropriate information using community organisations was expressed.
- Road closure information was not always available on time scales needed in fast-moving situations associated with bushfires on the urban fringe.
- Some angst was caused when information of a seriously threatening nature was delivered without suggestions about what the listeners could do in response to the threat.

The Importance of Community

Repeatedly, the Council heard that a strong, connected community was crucial to adapting to and being resilient in the face of crises. The desire to be more actively engaged during a prolonged crisis, and be given the means to do so, was expressed, stressing that:

- Information can overwhelm unless accompanied by empowering people to act and assist
- Better use could be made of community organisations; set plans in place now for future.
- Government could facilitate and coordinate community assistance in crisis and recovery.
- Children and young people should be assisted to engage more.
- People could to be trained to be volunteers of different sorts (fire-fighting, translation services, emergency food delivery or lodging, restoring damaged ecosystems, rescuing wildlife, social check-ins with the vulnerable); start that training now.
- Grief and trauma need to be shared with others, and a diversity of mental health support must be available.



The Built Environment

The community expressed a need for improved, climate-wise built environment, both in new and used stock, with a desire for ACT leadership. They felt that:

- Planning and new build in the ACT is not of high enough standard for changing climate.
- Existing construction standards (both for design and for workmanship) are inadequate, as may be enforcement of the Building Code.
- The ACT should lead on building codes, making them suitable for our region, including with respect to ventilation systems in the presence of smoke for rental and owned stock.
- There is an immediate need for better building standards for schools, day-care centres, and health centres.
- The "leakiness" of all buildings should be accessed. Are we safer at work or at home? Home or at school?
- Some ventilation systems and evaporative cooling systems may not be appropriate for the ACT, given that they offer no protection against bushfire smoke. Is retrofitting of filters a feasible option?
- Community buildings could be put to better use in future crises, especially for use as smoke and heat refuges, with information about such a plan disseminated in advance.

Other Infrastructure

Infrastructure, both soft and hard, natural and built was severely stretched and overburdened by the multiple events of the summer of 2019-20. The community expressed several ways that such infrastructure might be altered to improve climate resilience. Views included:

- If public transport cost less, more people would ride.
- A backup is needed for internet or other communication failures.
- Underground power lines could decrease power outage risks.
- Concern that current and proposed policies will not deliver the targeted ACT green canopy coverage. Some see tree-cover going "backwards" in new treeless suburbs and large apartment buildings lacking in natural shade.
- Changes are required to parks and wild areas to ease access and fire-fighting, and to ensure that new stock is climate resilient.
- Fire protection zones should be updated with freely-available information about implications for owners and tenants.
- The need to balance fuel reduction burning with habitat maintenance. What can we learn from indigenous practices that would be useful in the ACT?

What's Next?

The ACT Climate Change Council is deeply grateful for the engagement of the ACT community in March 2020.

Council is now actively reviewing a broad scope of expert advice into the causes, consequences and learnings associated with the climate-fueled crises of summer 2019-20 in the ACT. Combined with information gained from the community conversations, a report with recommendations will be crafted and delivered by the Council to the ACT Minister for Climate Change and Sustainability in mid-2020.

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