The Tree Report

Regenerating: Our Land Our People Our Future

2020

national
tree day

PLANET ARK | TOYOTA

> Our trees need to be cared for as they are sacred to us all, if we understand them. They hold knowledge as the apex in our forests, the holders of soil, the filters of air and the providers of story, fire, food, shelter and much more.

Oliver Costello, Bundjalung People, Firesticks Alliance Indigenous Corporation

Acknowledgements

Partnership

Toyota Australia

2020 marks 21 years of collaboration between Planet Ark and Toyota Australia – a partnership which has seen nearly 26 million trees planted around the country. Together, we have been able to complete thousands of environmental projects by connecting volunteers to their local communities. Support from Toyota Australia and their dealers enables us to continue working with Australians to create a world where we can live in balance with nature.

Content Contribution & Consultation

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Dr Mel Taylor is an Associate Professor in the Department of Psychology at Macquarie University. Mel's research has focused on preparedness, response, and recovery to low probability, high consequence events such as natural hazards emergencies, pandemics, terrorism, and emergency animal diseases. Dr Taylor is also a project leader in the Bushfire and Natural Hazards Cooperative Research Centre.

Australian Association Bush Regenerators

The Australian Association of Bush Regenerators (AABR) is an organisation that aims to promote the study and practice of ecological restoration, in addition to the effective management of natural areas. AABR is made up of a qualified, experienced team of experts who work with volunteers to support ecosystem regeneration around Australia. Find out more at www.aabr.org.au

Maggie Dent

Maggie Dent is an Australian parenting author and educator, with a particular interest in the early years, adolescence and resilience. Maggie is a distinguished speaker and writer, with six published books on parenting and the wellbeing of young people, as well as a popular podcast. Find out more at www.maggiedent.com

Firesticks Alliance Indigenous Corporation

Firesticks is an Indigenous-led network aiming to re-invigorate the use of cultural burning and to build on existing fire and land management knowledge. It is an initiative that provides an opportunity for all Australians to look after Country, share their experiences and collectively explore ways to support cultural identity and practice. Find out more at www.firesticks.org.au

Design by GLIDER

GLIDER is a research and conceptual studio, working in the area of human futures, transformation and new form experience design. Find out more about GLIDER at gliderglobal.com

Organic Photography by Mayu Kataoka

Mayumi Kataoka has kindly supplied some of her stunning photographs of Australian native trees and other plants, in addition to the devastating yet beautiful images of burned Australian landscapes. See more of Mayu's work at organicphotography.com.au

Foreword

A Message to the Tree Day Community

You're probably familiar with the phrase 'you don't know what you've lost 'til it's gone'. I see it written on motivational posters, and used as a prompt for us to think about what we have in the present and to reflect on and appreciate what we value now – for fear that we may lose it. This phrase feels particularly poignant at this time, thinking about the devastation caused by the relentless summer bushfires that affected so many parts of Australia, followed quickly by the financial and social disruptions caused by the COVID-19 pandemic. During this period we have all had losses, some momentous and life changing, others smaller but still significant to us.

Given these losses, and the constant visual reminders provided through media saturation of these events it is unsurprising that there has been a range of psychological impacts reported.

Alongside the more familiar conditions known to disaster mental health experts and typically experienced by those directly affected by bushfires, such as Acute Stress Disorder (ASD) and Post Traumatic Stress Disorder (PTSD), a relatively new condition "eco-anxiety" has been widely reported. Eco-anxiety (or climate anxiety) has been described in various ways, but essentially relates to anxiety caused by an awareness or understanding of environmental issues – "a chronic fear of environmental doom". This sense of being overwhelmed and powerless in the face of climate change and ecological disasters is a state familiar, I suspect, to many Australians who have witnessed the damage caused by drought and bushfires in recent years.

Earlier in 2020, researchers suggested that eco-anxiety should not be categorised as a mental illness, but instead considered a 'reasonable and adaptive response to an unfolding climatic crisis'.

When viewed this way, eco-anxiety can be reframed as a force that promotes social mobilisation and activism – a form of adaptive anxiety. Reframing, or 'cognitive reframing' is a process used in psychology in which situations, events and emotions are challenged and looked at from a different perspective, usually to change our way of thinking about them to something more positive or constructive. In this same way, we can decide how we wish to move forward from the devastating events of this last year.

To begin the process of recovery and regeneration, we need to think about how we have managed the challenges and setbacks we have faced, and to think about actions we can take to change things for the better as we move forward. In returning to my opening phrase 'you don't know what you've lost 'til it's gone', we can reflect now on what we value and need to protect for the future.

What better time to think about our connections, to one another and to our environment. The mental health and well-being benefits of our connections to outdoor space, to nature, to wildlife, are still only beginning to be captured and quantified by researchers, yet most of us already know how good these things make us feel.

This year on National Tree day we can join with others to reflect on what has been lost this last year in terms of our natural environment, and how we can take positive action by planting trees, caring for our natural surroundings, and mobilising in other ways to protect our environment into the future.

Dr Mel Taylor
Associate Professor
Department of Psychology
Macquarie University

Over 50% of Australians agreed that they felt compelled to act in the interest of environmental causes after witnessing the devastation of the 2019/2020 summer bushfires.

Individuals within the age bracket of 18-29 felt this desire to take action most strongly with over 60% compelled to act.

Independent research conducted on behalf of Planet Ark (Ipsos, 2020).

Hope for the Future

Eco-anxiety is an occupational hazard for those of us working in the environmental field. As Mel Taylor has eloquently observed however, the pain and suffering caused by the recent spate of ecological disasters has left many more of us prey to feelings of helplessness and hopelessness.

For essayist Rebecca Solnit[1], the antidote to despair is hope: not that of the optimist who believes things will turn out for the best without any help from them, but the kind of hope that inspires action, and particularly collective action.

This year's National Tree Day research report: Regenerating: our land, our people, our future, lays out the case for action. While reckoning with the devastation we have all observed and felt – and many continue to feel – to varying degrees, the authors nonetheless call on us to nurture our own resilience by nurturing the land.

They have provided us with many ideas of ways in which even our small actions can make a difference, and at the same time challenged us to turn crisis into opportunity and embrace ways of living that reduce harm and contribute to healing.

One of the positive offshoots of the massive upheavals we have experienced, is that the unimaginable has become possible. We now know we can be much more adaptable than we might hitherto have given ourselves credit for. The tragedy would be to squander this learning and revert to old patterns.

**Rebecca Gilling
Deputy CEO
Planet Ark**

It is devastating to see the impacts of the 2019/20 bushfires on our trees and Country. What makes it worse is knowing we could have prevented much of this damage through applying cultural fire and caring for country practices.

Oliver Costello, Bundjalung People, Firesticks Alliance Indigenous Corporation
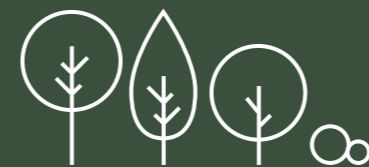
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Introduction

In the wake of relentless drought, a brutal and tragic summer of bushfires and the unprecedented COVID-19 pandemic, the Australian people and land are facing the task of recovering and rebuilding.

Regeneration is perhaps more important for the Australian people and our environment now than ever before.

National Tree Day

Each year, National Tree Day provides Australian communities with an opportunity to regenerate by connecting with each other and contributing to important environmental projects.

In 2020, we are celebrating the 24th year of National Tree Day. Our goal is to increase our previous total of 26 million trees, shrubs and grasses planted around the country with thousands of volunteers taking part in planting events in their local environment.

Given the hardships faced in the last year, this opportunity to get out in nature with family, friends and the wider community can help play a key part in the recovery of the Australian people, land and wildlife.

Report Focus

The monumental, life and landscape altering events Australians have faced in the past year have caused immense stress, devastation and loss. We aim to explore how our land and our communities have been impacted and how together we can start the journey towards regeneration.

This year's Tree Report will focus on regeneration from three perspectives, drawing on scientific research and expert opinion in order to share knowledge and provide practical tips for personal and environmental regeneration.

Regeneration For:

Our Land

Examining how Australian landscapes have been impacted by the devastating 2019/2020 bushfire season, in addition to ongoing drought that has caused widespread destruction.

Our People

Dealing with the mental health impacts of living through a global pandemic and an unprecedented bushfire season within six months, in addition to ongoing eco-anxiety associated with climate change and other environmental concerns.

Our Future

Investigating human resilience after exposure to trauma and how Australian ecosystems, while naturally resilient, may fundamentally transform if pushed beyond their tipping point.

Regeneration For Our Land
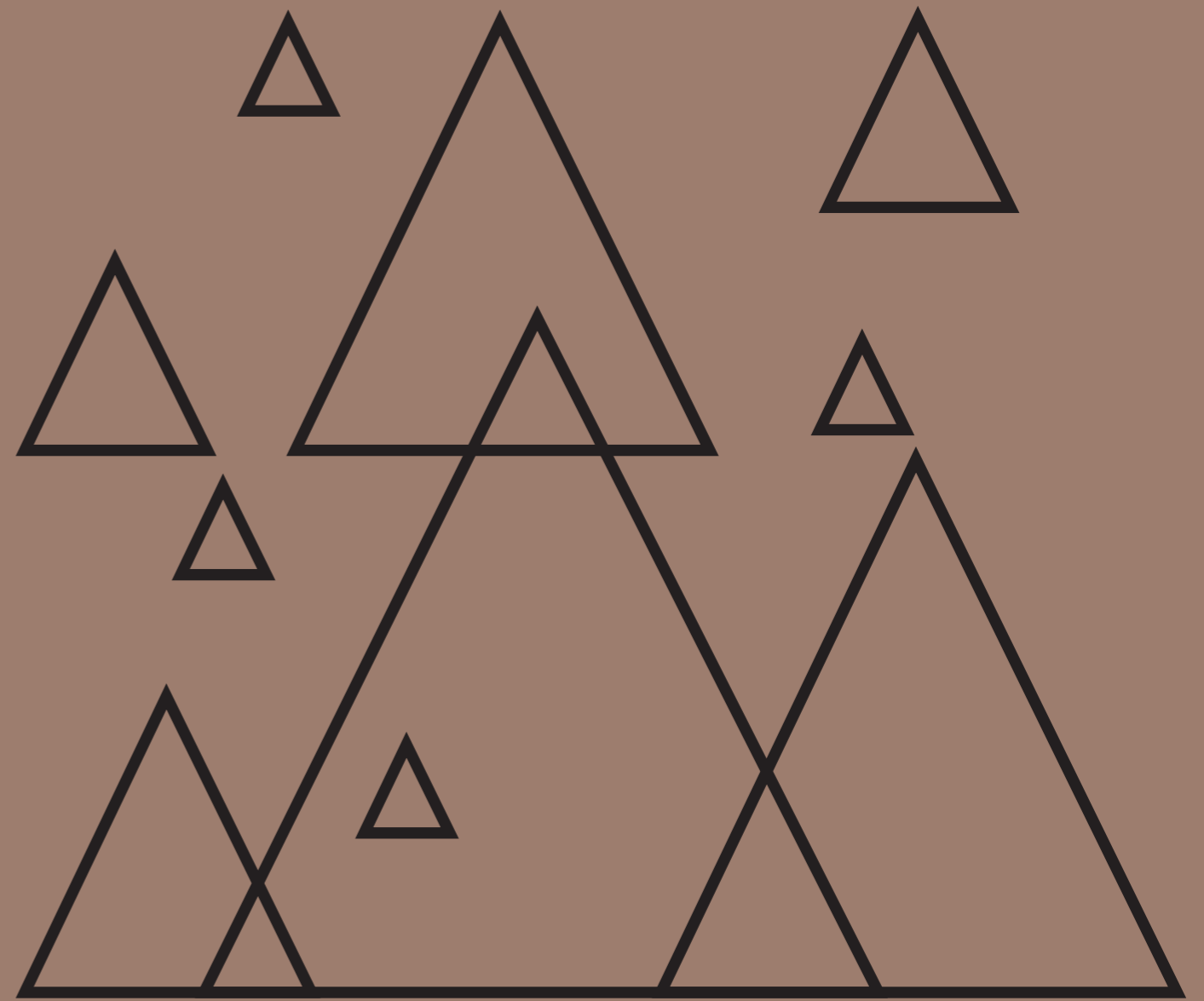
During the last three years, much of eastern Australia has been subjected to severely dry conditions, with rainfall in many parts of the region being close to or below record low values.[2] One of the main drivers for these drought conditions has been cooler sea surface temperatures in the eastern Indian Ocean – a climatic event called a positive Indian Ocean Dipole.

Over the last century, it is positive Indian Ocean Dipoles that have led to the worst droughts and bushfires in southeast Australia. Concerningly, the latest research[3] shows these events have occurred more frequently in the last few decades than in the last three hundred years. In addition, the last two years have seen record-breaking high land temperatures, with the summer of 2018/2019 being Australia's warmest on record.[4] This tragic combination of drought and heat created the perfect conditions for the extreme bushfires of summer 2019/2020, with more than 5.3 million hectares of land burnt in NSW alone[5] and an estimated one billion animals killed across Australia.[6]

Disruption

Regeneration

How are our Ecosystems Affected by Bushfires?

Many native Australian ecosystems are adapted to recover from fires. However, recovery depends on both the type of vegetation and the fire regime (how frequent the fires are, how intensely they burn and the season of when they occur).[7]

For example, Australian shrublands and grasslands are very well adapted to fire and usually recover well on their own, including where heath or grassy species occur as understories in forest or woodland. Eucalypt and acacia trees can generally recover from a fire but the rainforest vegetation below the trees can be set back. Rainforests and wetlands are very sensitive to fires and may take long periods to fully recover after severe fires. And in any of these systems, areas invaded with alien plants may suffer from disrupted recovery due to weed competition, or disrupted fire regimes due to a change in the amount of flammable plant material present.[8]

Often, our first reaction to the effects of bushfires is to consider the negative effects of fire on our ecosystems, including damage to vegetation, death or injury of animals, erosion, or increased impacts of weeds and feral animals. The summer bushfires of 2019/20 left no doubt of the scale of devastation that can occur during intense fire seasons. But where fire regimes are more appropriate, there are also many positive effects that fire can have on Australia's fire-adapted habitats.[9]

Less intense burns can renew sites long after the absence of fire, providing space and light for seedlings from a wider set of species to germinate on fertile soil. Two years after the severe bushfires in Victoria in 2009, rare and threatened plants, including those never previously recorded, began to germinate and flourish in Kinglake National Park.[10] Many of these new seedlings come from germination of seeds stored in the soil or of seed released from the tree canopy after fire.

Diverse post-fire growth, flowering and tree hollows created by fires provide resources for a suite of animals, and can help to rebuild shelter and nesting spaces.

Some of the benefits of fire have long been known and harnessed by Aboriginal people. Cultural burning is the term used by the Firesticks Alliance Indigenous Corporation to describe burning practices 'developed by Aboriginal people to enhance the health of the land and its people'. In addition to cultural benefits for people, some of the ecosystem benefits of cultural burning include protection and enhancement of many native plants and animals (like trees, grasses, koalas and emus) through seasonal patch burning. This creates differing fire intervals that support ecological resilience, biodiversity, succession of native species and protection and regeneration of our trees.

Managing fire regimes to balance differing conservation, biodiversity and community objectives has long been an ongoing challenge.[12] There is still much to learn, and scientists are working hard to assess how different ecosystems recover and change after recent large bushfires.

In January 2020 a rapid-response citizen science project was launched asking members of the public to visit bushfire affected areas in eastern Australia and record any signs of recovery they observed from plants, animals and fungi.[13] In six weeks, over 3,200 observations were made covering over 50 million ha, providing invaluable data to inform future conservation and management decisions.

> Joining with others to assist the recovery of bushland through a simple task like pulling out a weed is immensely healing. The penny drops about the link between our actions and the healing of nature – an immediate and reinforcing empathy.

Tein McDonald
President of AABR

NATIVE PLANTS
ABLE TO REGROW

WEEDING OUT
ALIEN SPECIES

The Importance of Regeneration

After witnessing the destruction wrought by the intense bushfires of the 2019/20 summer season, people might initially assume that the best way to help native ecosystems is by replanting lost vegetation.

However, the Australian Association of Bush Regenerators (AABR) advise that 'the need for planting is likely to be rare in our fire-adapted ecosystems, even after extreme fire'.[14] Rather than rushing in and planting, the AABR recommend that one of the best ways to support natural ecological regeneration at this time is by weed control in compromised areas.

The removal of weeds by fire provides an opportunity for bush regenerators to access sites and control weed regrowth in these areas, allowing native seedlings to regrow without competition from introduced weeds. With careful planning and an appropriate restoration strategy[15] this is often all that is needed to help native vegetation recover.

While the need for planting in natural areas after extreme fire is yet to be ecologically assessed, occasional replanting of some threatened species can be important to create 'insurance' populations in new locations.

For example, after the extreme bushfires in NSW, the Department of Planning, Industry and Environment is collecting seeds and cuttings from especially vulnerable plants like the endemic Prasophyllum orchids and vulnerable habitats such as rainforest, for nursery propagation and future replanting.[16] In addition, native plantings can act as a crucial mitigation tool against soil erosion where highly degraded sites do not recover any vegetation after major drought or bushfires.[17]

For those whose gardens were destroyed in the bushfires, experts recommend waiting for cooler weather and then planting native or fire-resistant plants to replace what was lost.[18] And after prolonged drought, schools and councils will no doubt also welcome regenerative plantings to provide shade and greenery in community areas.

With the input of government and community groups, and a wet start to 2020[19], the people of Australia are keenly anticipating the imminent regeneration of our land.

Regeneration For Our People

The hardships that Australia has faced in the last year – including drought, bushfires, floods and a pandemic – have not only resulted in direct physical hardships but have also impacted our mental well-being. It could take some time for us to fully recover.

Prof Mel Taylor says that, 'Living through traumatic or life-threatening events is a major risk factor for post-traumatic stress disorder later on',[20] and author Maggie Dent adds that, 'Our nervous system takes many months and sometimes even longer to finally settle after a major adverse trauma – and for us right now, the traumas keep coming'.[21]

But like the rest of nature we are often capable of adaptation and regeneration. Even though the future is uncertain, we naturally take opportunities to increase our resilience and recovery.

Well-being Challenges for:

Individuals

Communities

The Effects of Trauma

It is likely that all Australians have experienced some form of loss during the last year, whether due to direct or indirect effects of the summer bushfires, or through the restrictions that COVID-19 has placed on our social interactions and connection with outdoor environments. Other reactions such as fear, sadness, anger or difficulty sleeping are also normal, and may take some time to subside. Our capacity for regeneration will be influenced by the severity of the trauma we have experienced or been exposed to and by our individual circumstances.[22]

Apart from direct losses, those impacted by the bushfires would have also experienced fear for their own or their loved ones' safety, or for their pets or property. This kind of trauma can result in the occurrence of stress disorders like Acute Stress Disorder or Post Traumatic Stress Disorder.[23]

Those living in regions where the natural environment has been burnt or where there is relentless drought may also struggle with feelings of distress because they are regularly reminded of the loss of the environment they valued. This anguish has been termed 'solastalgia' – the distress caused by environmental stress.[24]

Even exposure to traumatic events through the media has been found to be harmful to mental and physical health.[25] Considering the overwhelming amount of information we are exposed to, it is unsurprising that people can feel anxiety about the environment as a result. In 2017 the American Psychological Society defined the term eco-anxiety to describe this 'chronic fear of environmental doom'.[26]

For example, distress over the bushfires may be intensified by fears of climate change which can in turn generate feelings of eco-anxiety as people consider the scale of the problems we are facing.[27]

Looking Out for Each Other

With so many advantages to being part of a group, humans are biologically wired to be social creatures and to need social interaction in family networks and within communities.[28]

This results in two very different outcomes for the mental well-being of communities after the events of the last year. On the one hand, the aftermath of drought, fire and floods may lead to a heightened sense of community well-being as people come together to rebuild and re-establish connections and routines. On the other hand, the isolation resulting from coronavirus quarantine could result in detrimental effects on community well-being and the erosion of connections.[29]

COVID-19 has not only interfered with the recovery of communities impacted by natural disasters, but it has introduced a range of stressors on the whole of society.

Social distancing restrictions have limited social contact for many people and the isolation resulting from this, as well as financial difficulties and lost opportunities is expected to have detrimental effects on community well-being.

Nevertheless, one of the positives that has emerged throughout all the challenges of the last year is that humans have an admirable capacity to help each other – whether it's raising money, going into fire-affected communities to help out, shopping for a neighbour, or putting teddy bears in the front window to cheer people up as they go past.

Families

Parenting author and educator Maggie Dent advises that in order to feel safe, calm and happy, children need several things:

They need their parents to be a 'safe base'.

They need predictability and routine.

They need lots of play, movement and physical activity.

They need to feel they belong.

The Need for Good Role Models

All of these things have been threatened by the drought, bushfires, floods and the pandemic. Families have faced unforeseen losses, whether to life, property or livelihood. Routines such as school and work have been totally disrupted. With normal activities like dance, music and sport all shut down and playgrounds closed children's lives have been tipped upside down. Family units have been isolated at home together. Children have been physically cut off from the people other than parents who help them feel they belong – their friends, teachers, neighbours, aunts, uncles, cousins and grandparents.

In order to cope with all these traumatic events, children need strong role models. Maggie Dent cautions that caregivers need to find ways to become the alpha figures in children's lives.[30] This is supported by research showing that children's mental health can be affected not only by their actual experiences of stressful events but also by the mental health of their caregivers.[31]

As well as being able supporters, caregivers also need to keep an eye out for changes in children's normal habits.

Even though research shows that children exposed to traumatic events may experience less post-traumatic stress than adults, they may experience other atypical behaviours including substance use, academic problems or conflict with peers.[32]

Finally, children not in immediate danger from bushfires or coronavirus may still suffer from indirect trauma like eco-anxiety, grief, depression or fear, with much of this being fuelled by media exposure. Maggie Dent advises us to leave the TV and radio off around children other than to watch high-quality children's programs, and reminds caregivers that they are the best people to answer the questions that children have in an age-appropriate way.[33]

Nature

Each Other

Connecting with Nature & People to Regenerate

A large body of research on the subject of biophilia shows the plethora of well-being benefits that connecting with nature provides, including reduced stress and improved mood. Biologist Edward Wilson describes the term biophilia as the 'innately emotional affiliation of human beings to other living organisms'[34] and proposes that connecting with nature is a basic human need originating from our evolutionary past.

Previous research carried out for National Tree Day reports supports this idea, showing that being in nature helps play a part in ongoing improved mental health[35] and that the benefits of outdoor play and learning for children are many and varied.[36] The benefits of spending time in nature are also recognised by the Australian Medical Association who suggest that a 'Green Prescription' comes with many health benefits.[37]

For many people, an unexpected benefit of quarantine was an increasing realisation of how important a connection with nature was to their well-being[38], and how beneficial it was to slow down and reduce our impact on the earth.[39] People were walking and riding in their local parks and neighbourhoods, spending more time in their gardens, growing their own food, buying potted plants and creating balcony gardens.[40]

Maggie Dent recommends play in nature (for children and adults) as a wonderful way to build pathways to calmness and mindfulness, to stimulate our senses, to help us build our immunity and physical fitness and to help us experience moments of awe. In bushfire-affected areas, a walk through bushland that is regrowing and recovering provides a welcome antidote to the traumatic images of devastation that we witnessed during the summer.

The benefits of connecting with others are also widely acknowledged, and are recommended by many experts and organisations as a tool to increase well-being during quarantine conditions (e.g. Lifeline: Staying connected through the COVID-19 crisis[41], Headspace: Create connections[42], Centre for Disease Control USA: Connect with others[43], Maggie Dent: Strengthening connection).[44]

After the SARS epidemic in 2003, research found that the increased social connectedness experienced by residents in Hong Kong offset the detrimental mental health impacts of the epidemic.[45]

For a double dose of well-being, connecting with nature while connecting with others is sure to benefit individuals, families and communities, helping us all to improve our well-being after the traumatic events of the last year.

As National Tree Day 2020 approaches, we hope that more Australians than ever can get outside to connect with nature and connect with others.

55% of Australians felt that time in nature improved their mood or eased anxieties during the ongoing coronavirus pandemic.

For those under 50 years of age this feeling was even stronger, with this number rising to over 60%.

Independent research conducted on behalf of Planet Ark (Ipsos, 2020)

Regeneration For Our Future

To develop a sustainable future, built on a harmonious relationship between humans and the natural world, human and ecological resilience will be of great importance. Resilience is a theme that appears often when looking to the future, particularly after exposure to trauma such as the horrific 'black summer' bushfire season and Coronavirus pandemic.

Building resilience in our mental health and our drought stricken, burned landscapes will assist in regeneration and recovery after what has been a devastating year for Australians.

Human Resilience

Innate Human Resilience

There is no doubt that the eco-anxiety associated with bushfires and other ongoing environmental issues, in addition to living through the COVID-19 pandemic has been stressful for many people in Australia.

Disasters such as these often cause sweeping damage, hardship, or loss of life across one or more strata of society. It can take years to recover from disturbances like the ones we've faced, though the events themselves may pass relatively quickly. After disasters, such as the devastating Australian 2019-2020 bushfires or the COVID-19 pandemic, people are likely to suffer from depression, grief, and anxiety (including eco-anxiety), or PTSD.[46] Many Australians have been impacted by trauma associated with either being directly affected by these disasters through loss of loved ones or property, or watching on as people and wildlife lose their lives.

Humans are resilient creatures. We face stress, sadness and life altering events, but can find ways to continue living. The word resilience originates from the Latin verb resilire, meaning "to jump back" or "to recoil". There is always an element of recovery involved in resilience, that enables a person to bounce back, as it is usually associated with exposure to disturbances or setbacks.[47]

The American Psychological Association highlights that having resilience doesn't mean that a person doesn't experience difficulty and distress. Most people will suffer from stress, trauma or grief at some point in their life, however resilience is the ability to rely on behaviours, thoughts and actions to work through recovering from this stress.[48]

Despite the distress experienced by people during traumatic events, studies have found human mental health can recover in many people, even those most impacted by such traumatic events.[49]

Although many people are psychologically harmed by disasters, they also manage to endure their consequences with minimal psychological cost. For example, 3-4 years after the 2009 Black Saturday bushfires, only 16% of people from a high-affected group had probable PTSD linked to the bushfires.[50] Although individuals may struggle with symptoms such as anxiety, confusion or depression after a traumatic event, a broad study by Bonanno (2005), found that the most common reaction among adults exposed to such events is a pattern of healthy functioning, in addition to the continued capacity for positive emotion.[51]

Studies such as this support the belief by many psychologists that resilience is "part and parcel of the innate mental health built into all human beings".[52] Crane delves further into this idea of inbuilt resilience, suggesting that our ability to withstand disturbances and bounce back is shaped by our individual circumstances, our personalities and our ability to reflect on how we have worked through challenges in the past.[53]

This is cause for optimism at an individual level and highlights our ability to heal and regenerate. Personal regeneration in the wake of the traumas that Australians have faced in the last year is critical in building resilient futures for ourselves.

Ecological

Resilience

Defining Ecological Resilience

Resilience is key in ensuring a productive, stable and functional future, and this is true for any type of ecosystem. In an ecological context, resilience is defined as the ability of an ecosystem to maintain its normal patterns of nutrient cycling and biomass production after being subjected to damage caused by an ecological disturbance.[54]

The concept of ecological resilience was introduced by C.S Holling in 1973.[55] Since then, multiple definitions of the term have developed, though it remains clear over time that the more resilient a system is, the lesser chance it has of facing severe destruction or extinction.

Australian people and ecosystems have had to draw on this resilience over the past year, in order to recover and rebuild after facing major disturbances. Many communities directly impacted by the Australian 2019/20 bushfires, as well as millions that were indirectly impacted and watching on, have had to rely on their personal resilience to get through the traumatic summer and the months thereafter.

The resilience of the Australian environment has also been tested with many parts of the country being pushed to or beyond their limit and some areas may never fully recover.
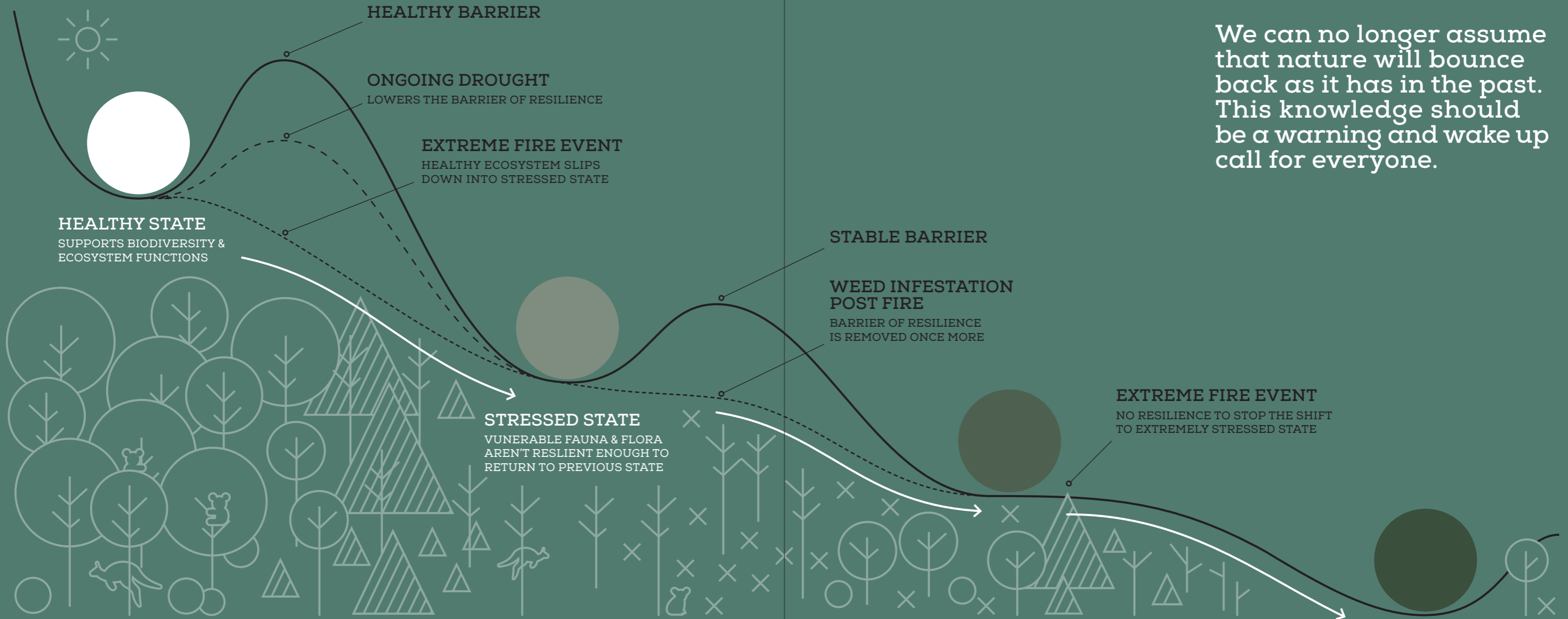
Australia's Changing Fire Patterns

If Australian ecosystems are repeatedly exposed to droughts and fires as extreme as those seen recently, the resilience of these ecosystems will continue to be eroded over time. Like humans, many ecosystems in Australia are innately resilient and many native plants and animals have adapted to fire, however in recent years the fires are changing.[56] The dryness of Australian landscapes, due primarily to ongoing drought, created the perfect conditions for the intense and extensive fires of 2019/2020. The extreme heat and geographical extent of these fires have created conditions in many fire affected areas that are not optimal for regeneration. In many areas, particularly those that have been exposed to fire more frequently than usual, there will be a change in tree species and diversity, favouring those species most adapted to fire.[57]

In extreme cases, there may also be a reduction in overall number of trees.[58] This lack of trees will have flow on impacts to the other flora and fauna that depend on the affected area, as a single tree can provide a home to a range of living things including fungi, insects, birds, reptiles, mammals and other plants.[59]

There will also be changes to the soil, hydrology and overall biodiversity in affected areas.[60] As the impacts of climate change continue to intensify, landscapes such as these that are battered with more intense and frequent fire events and drought in addition to land clearing and over grazing, will become less resilient and potentially shift to another 'stable state' altogether.

A Slippery Slope to Biodiversity Loss

HEALTHY BARRIER

ONGOING DROUGHT
LOWERS THE BARRIER OF RESILIENCE

EXTREME FIRE EVENT
HEALTHY ECOSYSTEM SLIPS
DOWN INTO STRESSED STATE

HEALTHY STATE
SUPPORTS BIODIVERSITY &
ECOSYSTEM FUNCTIONS

STABLE BARRIER

**WEED INFESTATION
POST FIRE**
BARRIER OF RESILIENCE
IS REMOVED ONCE MORE

STRESSED STATE
VUNERABLE FAUNA & FLORA
AREN'T RESLIENT ENOUGH TO
RETURN TO PREVIOUS STATE

EXTREME FIRE EVENT
NO RESILIENCE TO STOP THE SHIFT
TO EXTREMELY STRESSED STATE

We can no longer assume
that nature will bounce
back as it has in the past.
This knowledge should
be a warning and wake up
call for everyone.

**EXTREMELY
STRESSED STATE**
DRAMATIC CHANGE TO
ECOSYSTEM SUPPORTING
MUCH LESS LIFE & DIVERSITY

Alternative Stable States

The idea that ecosystems can shift between 'alternative stable states' is part of ecological resilience theory. Most ecosystems have evolved to be resilient, in that they can bounce back after a disturbance, as long as these disturbances are within the threshold of tolerance. Once a tipping point is reached and an ecosystem has absorbed more disturbance than it can handle, this is the point at which it will shift into a new state or collapse altogether.[61]

In most cases, this new state is still stable, though fundamentally changed, usually it supports less biodiversity and a new range of ecosystem services and functions. The resilience typically decreases as states shift, meaning they can more easily shift and decrease further in productivity and functionality.[62]

The future of our natural world is uncertain. If the earth's temperature continues to rise, while we continue practices that contribute to land clearing, over-grazing and pollution, there is a real risk of this 'slippery slope' effect happening in many ecosystems around the world. These ecosystems will lose their ability to support the levels of biodiversity they once did, which will in turn push species to the brink of extinction and fundamentally change our planet.

TREES &
BUSHLAND

BUSHFIRE

WEEDS

Building Resilient Futures for:

Our Selves

Our Planet

A Way Forward

Although humans are naturally programmed to be resilient, often the ability to 'bounce back' after trauma is reliant on strengthening certain behaviours or practices and working with resources that will assist recovery.[62] Psychological studies have highlighted some factors that support the process of recovery over time.

These studies have consistently found that close connection with at least one other person is a central resilience resource.[63] Fostering connections with other people and developing a sense of belonging is key to both recovery after trauma and ongoing resilience. Furthermore, those who are able to draw on positive capacities, like hope, optimism, and self-efficacy may be able to recover, or even grow from adversity.[64]

In recent years, such responses have been of interest to researchers, who now refer to 'bouncing forward' after adversity[65], where individuals and communities come back stronger and better positioned to face future challenges.

Unfortunately, it is highly likely that Australia will continue to experience environmental disasters. Additionally, intensive animal agriculture practices, increased human-wildlife interactions and the interconnectedness of our world mean that another pandemic is probable.[66] Mental preparedness for future disturbances is another important part of building resilience. Being prepared for stressful situations and having plans in place for their occurrence can help to ensure our mental health is as strong as possible if faced with these scenarios.

In Australia there are a number of resources available to help us manage ongoing anxiety, depression and a range of other feelings, in the wake of the bushfires and the COVID-19 pandemic. Utilising these resources, connecting with nature and loved ones are some of the key elements involved in personal recovery and strengthening resilience.[67]

We need to support our natural world in building and maintaining resilience. If regeneration and recovery can occur before a distressed ecosystem reaches its critical 'tipping point' and shifts states, every effort should be made to enable this bounce back.

To prevent a landscape that has been hit by bushfires and drought from shifting to a new, less productive state, strategic and ecologically informed interventions are needed. This includes large scale societal actions such as engaging in actions to shift to more sustainable economies and lifestyles.

Additionally, managing fire in a manner that strategically reduces fuel without fragmenting ecosystems, undertaking post-fire weeding to allow natural regeneration to occur without competition, or active revegetation of the area will help to strengthen the landscape.

All these actions may help to reduce the causes of environmental degradation and help our plant and animal species – and ourselves – manage and survive future bushfires.

The Australian environment is naturally resilient, however human induced factors such as climate change, over-grazing, deforestation, aridification and pollution, among others are constantly reducing ecosystem resilience over time.

Regeneration of our environment and a shift away from damaging practices is critical, as we are currently seeing a trajectory of change and destruction that our environment and many living things cannot tolerate. It is up to us to take positive action that will heal both humans and nature.

Image Credit: Firesticks Alliance Indigenous Corporation

Our Goals Moving Forward

Linking Human & Ecological Resilience

Human resilience and ecological resilience are by no means mutually exclusive. Participating in activities such as weeding or tree planting will have positive impacts on mental health such as a reduction in stress, while also assisting in the recovery or expansion of natural landscapes.

These outcomes will strengthen the innate resilience in both people and ecosystems. Humans crave connections with nature and contributing to projects that help build resilience in our ecological landscapes will assist both ourselves and ecosystems in bouncing back when inevitable future disturbances occur.

It's Time for Change

Now is the time to reimagine our way of living. The scale of devastation and destruction we have seen in the last year, due to the summer 2019/20 bushfires and coronavirus pandemic, has highlighted the need for change.

In addition to combating climate change through a shift to renewable energy sources, a circular economy model and limiting the degradation of our land, the coronavirus pandemic has highlighted other areas where change is needed.

We need to re-evaluate our cities, workplaces, transport and lifestyles as a whole both now, while living with coronavirus and in the future to prepare our societies for the likely event of another pandemic.

Now is the time to embrace innovation, get behind changemakers and support ourselves and our land in regenerating, to build a brighter, greener and more resilient future.

Practical Steps to Regeneration

For Mental Health
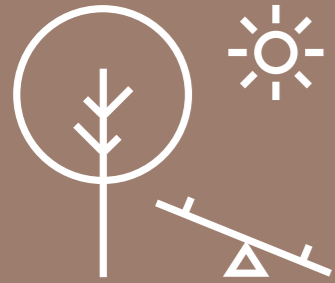
Go Outside

Connect in nature – spend time outside doing something you like from gardening to bushwalking.

Reconnect

Catch up with friends and family and those around you.

Find Support

Consult available mental health resources for support and tips.

Take Action

Make lists and complete tasks that are addressing the issue and bring you a sense of satisfaction.

Be Informed

Avoid a deluge of media – get informed from a few trustworthy sources.

Be Mindful

Practice mindfulness – create space for yourself, to breathe, to reflect – space between yourself and your reactions.

Practical Steps to Regeneration

For the Environment

Plant a Tree

This National Tree Day – plant a tree in your front yard to share with your local community.

Get Involved

Get involved in a citizen science project.

Join in

Get involved with local landcare and bushcare groups.

Remove Weeds

Focus on weeding after bushfires to let natural regeneration happen.

Show Support

Support environmental initiatives you believe in.

Spread the Word

Get your friends and family involved in your actions to help the environment.

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