ACT Government

Caring for Dhawura Ngunnawal

A natural resource plan for the ACT

2022–2042

Ngunnawal Acknowledgement

Dhawura nguna ngurumbangu gunanggu Ngunnawal

Nginggada dindi dhawura Ngunnawalbun yindjumaralidjinyin

Mura bidji mulanggaridjindjula

Naraganawaliyiri yarabindjula.

Ngunnawal Language Acknowledgement Translation

This country is Ngunnawal ancestral, spiritual homeland

We all always respect elders, male and female, as well as Ngunnawal country itself

They always keep the pathways of their ancestors alive

They walk together as one.

Acknowledgement of Country

We acknowledge the Ngunnawal people as traditional custodians of the land and recognise any other people or families with connection to the lands of the ACT and region. We wish to acknowledge and respect their continuing culture and the contribution they make to the life of this city and this region.

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Cover: Mark Jekabsons, Snowgums on Mt Gingera; Page 2, 3 and 7: Mark Jekabsons Booromba Rocks at dawn; Page 14: Jennifer Finlay, Bimberi Wilderness view from Mt Bimberi; Page 18 and 20: Marissa McDowell, Page 22: Brian Hawkins; Page 25: Marissa McDowell (left) and Mary Bonet (right); Page 27: Kirsten Tasker; Page 29: Richard Snashall (left) and Jeni De Landre (right); p.33 Mark Jekabsons, 34. Mark Jekabsons (left), Emma Carlson (middle) and Mark Jekabsons (right),p.37 Mark Jekabsons (left) and Hannes Botha (right), p.38 Helen Hunter (left) and Will Raymont (right), P.40 Mark Jekabsons, p.41 Nicki McPhan,p.42. Emma Carlson (left) Mark Jekabsons (right), p.43 Brian Summers, p.44 Mark Jekabsons, p.45 Will Raymont, p.56. Mark Jekabsons (left) Brian Hawkins (right), p. 57 Mark Jekabsons (left) Karen DeBritt (right), p.59 Nicki McPhan (right), Brian Hawkins (left), P.60 Brian Hawkins, p.66 Mark Jekabsons, p.68 Mary Bonet (left) Mark Jekabsons (right) p.70 Mark Jekabsons, p.72 Anna Haiblen, p.77 Brian Hawkins, p.83 Mark Jekabsons.

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Foreword

The people of the ACT are the custodians and beneficiaries of our natural environment including water, plants, animals, diverse ecosystems and unique and often rare species. The decisions we make as individuals and as a group impact directly on the health and resilience of our natural environment and community wellbeing.

The collaborative management of these assets is critical to connect people and landscapes and to prepare the ACT for the challenges of the future. Our community includes many groups who are important in forging these connections such as Ngunnawal Traditional Custodians and other families with a connection to the ACT, rural landholders, community groups, non-government organisations, urban dwellers, environmental volunteers, schools, universities, researchers, local businesses and industry.

For natural resource management (NRM) planning to be successful, it must value the contribution and aspirations of the community and understand the ways in which people can better engage with landscape and culture in an integrated and respectful way. People have different perspectives and interests and acknowledging this is an important step to move forward together.

Pressure on our natural resources, particularly water, agricultural production and biodiversity, is increasing all the time in the face of climate change. We have seen increasing temperatures, catastrophic fires, post-fire flooding and erosion. This is predicted to worsen with hotter temperatures, more extreme weather events, increased bushfire risks with more intense fires and longer, harsher seasons. These climatic impacts are on top of the continued increasing pressure from urban expansion and intensification. Ecosystems will need to be managed to be resilient and adaptable, with a focus on improved ecological connectivity across different land tenures, sustainable and integrated farming practices and the protection and restoration of catchments to ensure we have ongoing access to clean water. To be successful, we need to learn from, include and celebrate our Traditional Custodians in all our land management activities.

The ACT Natural Resources Management Plan offers the opportunity to the community and government to work together to create a shared vision for natural resource management in the ACT and to identify ways in which this can form the basis for a healthy, connected and sustainable future. The involvement, acknowledgement and respect for Ngunnawal knowledge and cultural practices is important for the ongoing management of Ngunnawal country. In particular, this requires the integration of cultural practices into land and water management.

Rebecca Vassarotti MLA Minister for the Environment

Vision

The ACT and Region community working together with government to care for our natural resources, recognising their importance to social and economic development, environmental services, resilience to climate change and the protection of threatened species. We respect the bush capital identity of the ACT on Ngunnawal country.

What is NRM?

Natural resources management (NRM) is the integrated management of the natural resources that make up Australia's landscapes; that is, our land, water, biodiversity and cultural assets that we rely on for our survival and wellbeing. NRM takes account of human activities and natural processes to ensure they are carefully managed to deliver the best outcomes for today's needs and for future generations. NRM considers the multiple benefits provided to humans by the natural environment, which are known as 'ecosystem services'. These services are essential for clean drinking water, clean air, the decomposition of waste, mitigation of extreme weather events, food production, and human mental and physical wellbeing. NRM also takes account of how the community feels about their landscape.

Find out more about NRM at: https://www.environment.act.gov.au/act-nrm

Purpose of the Plan

The ACT is an 'NRM region' under the National Landcare Program. The Australian Government requires each funded NRM region to create and maintain an effective NRM plan.

These integrated plans outline pathways to protect and sustainably use natural resources within each region. Each plan identifies and prioritises integrated NRM goals, targets and associated actions.

The Australian Government requires each plan to:

- involve the community, including the Aboriginal and Torres Strait Islander community
- be based on best available scientific, economic and social information and be appropriately scaled and scoped
- identify and describe the 5-year Outcomes and Investment Priorities relevant to the region
- describe stakeholder aspirations for NRM and how these align with the 5-year outcomes
- identify and prioritise NRM actions based on determined outcomes
- identify how to ensure comprehensive community participation in delivery of the plan
- incorporate traditional ecological knowledge, in accordance with agreed protocols and with prior approval of the Indigenous custodians of the knowledge
- undertake monitoring and evaluation to demonstrate effectiveness.

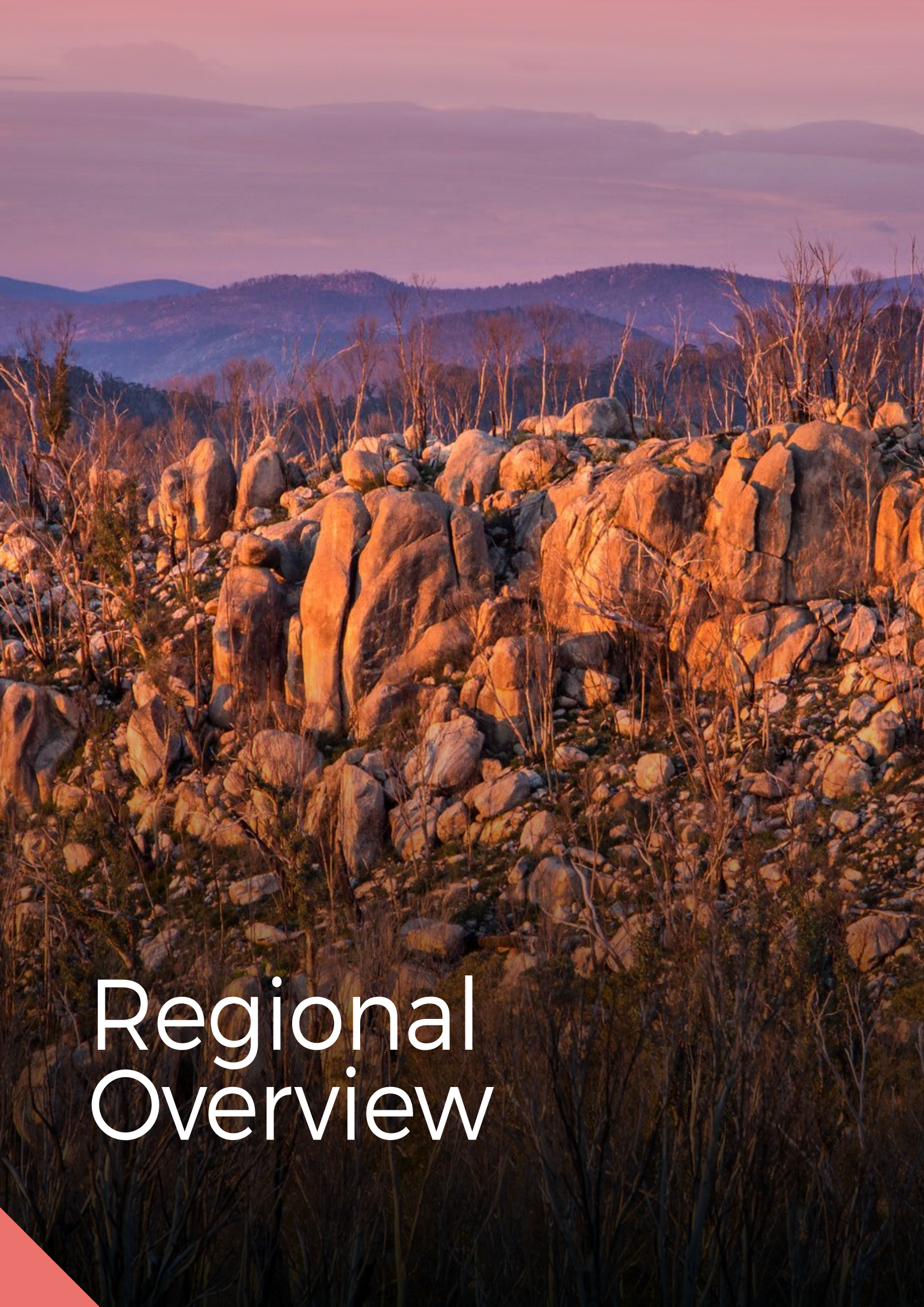
The ACT NRM Plan (the Plan) proposes a way forward for the management of natural resources in the ACT over the next 20 years, with a 5-year review period. It reflects the priorities put forward by the Canberra community through extensive stakeholder consultation, underpinned by the best available science and knowledge. The input of the Canberra community and key stakeholders has been critical in the development of the Plan.

The Plan recognises that NRM is a shared responsibility, and that the collaborative management of natural resources of the ACT is paramount to ensure that people and landscapes are connected, and the ACT is prepared for the challenges of the future in the face of climate change and increasing pressures on our natural assets. The Plan gives priority to protection and restoration of the environment within the broader economic, social and political context and, importantly, recognises the strong connection between people and nature.

The Plan provides a road map of the key actions identified by extensive consultation with the primary stakeholders in natural resource management in the ACT and Region.

The timing to implement each action will be dependent upon agreed priorities, the complexity of the action and availability of resources and will be determined by collaborative agreement between government and community.

Although the Plan is a non-statutory document, it is endorsed as a whole-of-government document by the ACT Government. All targets and initiatives are intended to be consistent with existing ACT Government strategies; objectives will be sought to be delivered across government in an integrated manner.



Regional Overview

Regional Overview

Dhawura Ngunnawal

The Ngunnawal people are original inhabitants of the Canberra region and its earliest land managers who continue to remain culturally connected to Country. Ngunnawal people occupying the diverse landscape of the ACT region possessed great knowledge of the environment, skilful custodianship and close cooperation with their own family members and other groups. This knowledge lives on through the Traditional Custodians today (ACT Government, 2021).

Ngunnawal people's kinship systems and songlines follow the waterways including the Murrumbidgee, Molonglo and Cotter rivers, which flow through the ACT. These rivers and their tributaries represent the Ngunnawal people's Dreaming, their cultural roots, sense of belonging, identity and purpose. Community are entrusted with the responsibility to care for Country (Commissioner for Sustainability and the Environment, 2019).

The Ngunnawal people normally moved in small blood/family groups although, on occasion, held gatherings of a thousand or more people at a time, coming together to make use of resources that were seasonally abundant (ACT Government, 2021).

The Ngunnawal people have been here for tens of thousands of years and continue to live and work in the community today. Ngunnawal and Aboriginal people are increasingly more engaged in land management decision making both within and outside government. The importance of understanding traditional land management and cultural lore is being recognised more and more by government, land managers and the community (ACT Government, 2021).

ACT population

The ACT's population is more than 432,000. According to the latest projections, the population is expected to increase to 700,000 by 2058. This growth is likely to lead to an expansion of the urban footprint, particularly in the areas of Molonglo, Belconnen and Gungahlin (ACT Population Projections 2018–2058) (ACT Government, 2019).

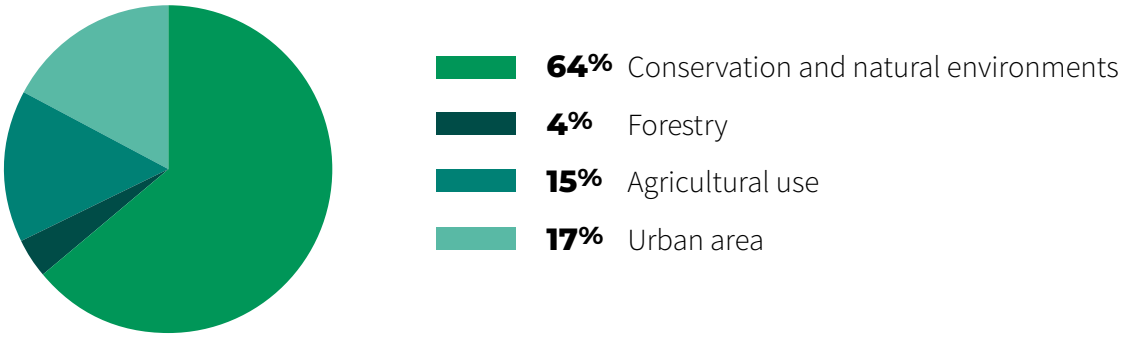
The 2019 State of the Environment (SoE) report identifies population is a key driver of environmental pressure. As the population increases, so does the demand for energy and resources, the amount of waste generated and the need for land development for infrastructure, housing and energy production (Commissioner for Sustainability and the Environment, 2019).

Everyday decisions are critical to reducing pressures on the environment. For example, minimising vehicle use, increasing water and energy efficiency in the home, reducing the consumption of goods, choosing products that are better for the environment and improving recycling and reuse.

Land use

The ACT NRM region covers 2,358km^2 in area with:

- 64% of the land area is classified as conservation and natural environments (ABARES, 2016) Categories of conservation in the ACT include national park, wilderness area, nature reserve, water supply protection and special purpose reserve
- 4% forestry,
- 15% devoted to agricultural uses,
- 17% dedicated to the urban footprint of the city of Canberra.



Land use is a key driver of environmental change. Many environmental issues in the ACT result from current and historic land management practice including land clearing, urban development, past agricultural activities, forestry operations and a high concentration of recreational activities in some areas.

Poor land health can lead to the loss of vegetation and habitat and severely impact water quality and biodiversity. Poor land health also impacts agricultural production through the loss of soil nutrients and organic matter, reductions in crop yields and pasture production, increased erosion and reduced water quality.

Our natural environment

Around 60% of the ACT is conservation reserve, including Namadgi National Park, Tidbinbilla Nature Reserve and the many urban reserves that make up Canberra Nature Park. These reserves offer protection for local species and ecosystems as well as recreational opportunities for our community.

The ACT has two major river catchments—the Murrumbidgee and Molonglo—and important tributaries such as the Cotter River, Ginninderra Creek and Jerrabomberra Creek. These are important for Canberra's water supply and agriculture. They provide habitat for a diversity of native species (including many threatened species), amenity and recreational opportunities for the community.

Agriculture

Agriculture plays a significant role in the ACT, with 40,000 hectares (15% of the ACT) managed by our farming families. These farms produce beef, lamb and wool and undertake horse agistment and equestrian enterprises. Other ACT agricultural enterprises include free range eggs, chickens, alpacas and llamas, fruit and vegetables, wine, olives and truffles.

Soils

Soils are a major resource that underpins the health of natural, urban and rural ecosystems. (ACT Government 2013) Soils in the ACT reflect variations in climate, parent material and relief from west to east. Excluding the ACT highlands, most ACT soils have a characteristic texture contrast, with a sharp to clear boundary between the lighter textured topsoils and the coloured clay subsoils. Typically, shallow rocky soils are found on crests; Red texture contrast soils are found on mid slopes; Yellow and Brown texture contrast soils occur typically on poorly drained lower slopes; highly sodic soils (with exchangeable sodium of 6% and greater) occur in minor drainage lines and contribute to gully erosion, particularly on farm land; and alluvial soils occur on floodplains. (Cook et al, 2016)

Distinctive features of ACT soils irrespective of geology are that they have inherently acid topsoil; they have shallow (<20cm, many <10cm) topsoils; sodic (erodible) subsoils occur in drainage lines and contribute gully erosion; they have hardsetting bleached A2 horizons; shallow, often stony topsoils; are organic matter deficient and generally infertile. The granitic soils tend to have deeper and sandier topsoils. The soils on metasediments are usually less fertile, saltier and stonier. (Cook et al, 2016)

ACT's farming enterprises, typically occur mainly in the more gently undulating lowlands of the ACT, including areas of existing and former woodlands and grasslands, and alluvial floodplains.

Climate change is likely to impact on soil properties that are sensitive to climate variables such as rainfall and temperature which lead to changes in soil erosion, organic carbon, nutrients and alkalinity (NSW Government, 2022). Careful soil management will be needed to minimise these effects on agriculture and native ecosystems, which are considered in the ACT Drought Strategy.

Urban footprint

Our urban footprint continues to grow. The ACT Planning Strategy (ACT Government, 2018) sets a target for 70% of new growth to occur within the existing urban footprint. Currently, 58% of the projected growth is accommodated through 'infill' within the existing urban footprint. New greenfield developments are being planned and constructed in the Molonglo, West Belconnen and Gungahlin areas. In addition to the direct impacts, increased urban development brings related challenges such as the need for increased transport and infrastructure, which has further impact on the environment.

Climate change

Climate change, one of the most challenging issues faced, has implications for all key focus areas in this plan. Climate change will increase the pressures on land and human health, with predicted higher temperatures, reduced rainfall, more extreme weather events, and an increase in fire risk and severity (Commissioner for Sustainability and the Environment, 2019). Projections of significant shifts in local climates and increases in drought, bushfires and storms will have an impact on biodiversity, natural ecosystems and human wellbeing.

Based on long-term observations, the Bureau of Meteorology reported mean temperatures in the ACT have already increased by about 1°C since the 1950s. Canberra only reached 40°C nine times in the first 94 years of observations from 1913 to 2006 (and did not reach 40°C at all between 1973 and 1998). In the 12 years from 2007 to February 2019, there have been 16 days over 40°C (Commissioner for Sustainability and the Environment, 2019).

Climate change is increasing the variability of rainfall and the localisation of storm cells, increasing the potential for drought. Changing rainfall patterns are predicted to bring more intense rainfall events with increased risk of flooding.

It should also be recognised that climate change may also result in novel ecosystems where a new suite of species results from the changing climate.

A 2021 draft report evaluating the risks of climate change for the ACT (AECOM, 2021) has identified key risks across five domains:

- Environment: concerns for the viability of ecosystems and endemic species (particularly in sensitive areas such as alpine and subalpine zones); a desire to improve strategic planning to facilitate the redistribution of species as changes to habitats occur; biosecurity and threats by species not endemic to the ACT (which may perform better under future climate conditions); and the need for baseline data to enable effective monitoring of ecosystem changes into the future.
- Social: the impact of climate change on the public health and education sector; concerns for the suitability of current housing stock providing adequate thermal comfort in future conditions; and impacts to whole-of-government service delivery to support the community (particularly vulnerable communities).
- Built environment: damage and disruption to infrastructure (such as electricity, transport, water supplies, communications), which can cause severe interruptions to government service provision; and concerns for a lack of climate change consideration in strategic planning.
- Economy: impacts to business reducing the overall prosperity and productivity of the economy; impacts to tourism as changing conditions change visitor preferences or perceptions of the Territory; concerns for public finances associated with the increasing costs of responding to and recovering from extreme climate events; and a potential reduction in innovation in the long term as resources shift to response and recovery (leaving less time for innovative activities).
- Governance: ongoing emergency management concerns and the ability to maintain service levels in the long term; and the ongoing coordination of funding streams to support climate risk reduction and adaptation.

The ACT Government is already taking steps to address climate change through:

- ACT Climate Change Adaptation Strategy (2016)
- ACT Climate Change Strategy 2019–2025 (2019)
- ACT Government Risk Management Framework
- ACT Wellbeing Framework (2020)
- Canberra's Living Infrastructure Plan: Cooling the City (2019)
- Enabling Adaption in the Australian Capital Territory (2014)
- Strategic Bushfire Management Plan
- ACT Territory Wide Risk Assessment (2017)
- ACT Water Strategy 2014-2044 (2014).

The draft climate change risk assessment incorporates these existing strategies and frameworks and the Plan has been developed within this context.

Fire

Fires are a natural occurrence in the Australian landscape, necessary to maintain the health of a range of native species and ecosystems. The ACT landscape has evolved with fire and Aboriginal people developed a sophisticated understanding and use of fire to manage land and resources and reduce bushfire risk.

Uncontrolled bushfires, as well as some hazard reduction burns, can have a significant negative impact on biodiversity, human settlements and natural resources. Negative impacts are mainly the result of changes in fire occurrence and severity. Increased human sources of ignition, the suppression of natural fire to protect human life and assets, and prescribed burning for the management of fuel loads can change the natural fire regimes required for biodiversity and ecosystem health. In addition, increased periods of drought and higher temperatures from climate change have increased the risk of more frequent, large, and severe fires. Climate change is also driving significant changes to damaging fire regimes leading to higher likelihood of high severity fire.

The 2019–20 summer bushfires burnt more than 10 million hectares (ha) across Australia. In the ACT, the Orroral Valley fire burnt 87,923ha, largely in Namadgi National Park, with more than 80% of the park burnt. It is estimated that 22% of the park was burned at a high to very high fire severity. Ninety percent of the area burn in Namadgi National Park in 2020 had also burn in the 2003 Canberra Bushfire, just 17 years earlier.

Changes to natural fire regimes and the increasing risk of fire occurrence have potential social, environmental and economic impacts including:

- adverse effects on fauna and flora, by killing individual animals and plants, destroying altering vegetation structure and changing the availability of some habitats (or rendering them temporarily unsuitable) and reducing populations, which may push some threatened species towards extinction
- an increase in fire frequency can result in a shift in the flora mix towards fire tolerant species which can also lead to an increase in fuel load
- increased occurrence of severe bushfires with significant risks to human life and health
- increased property and infrastructure loss
- post-fire rainfall that creates erosion and results in run-off that degrades water quality affecting aquatic health and biodiversity
- loss of important heritage, particularly Aboriginal heritage sites and historic European sites and damage to landscape amenity
- loss of agricultural production through destruction of infrastructure, crops, pastures, stock and plantation forests
- smoke from bushfires and controlled burns that increases air pollution, especially particulate matter and summer smog, which is particularly significant for people with asthma and chronic lung disease.

Fire can also be a useful tool in natural resource management for ecological and cultural purposes. As an example reducing biomass in grasslands to enable a diversity of forbs and threatened fauna to survive.

Our community

In the ACT, we are lucky to have a community that is passionate about the environment and a network of not-for-profit community groups who facilitate environmental volunteering. Many community members have a wealth of environmental, ecological and land management knowledge and a high level of commitment.

Community volunteers contribute to all areas of NRM, including citizen science research and monitoring programs, caring for wildlife, undertaking on-ground works such as weed control and revegetation and providing a strong voice for the environment. Community public land stewardship groups supported by Landcare ACT, the Catchment groups, Parkcare and the Urban Landcare Program have been in place for more than 30 years; many long-established groups have been undertaking stewardship of urban parks and reserves for decades with vast accumulated local knowledge. The Environmental Volunteers Report by the Office of the Commissioner for Sustainability and the Environment shows that there are now more than 70 Landcare and Parkcare Groups in the ACT region and approximately 6000 regular volunteers. (Commissioner for Sustainability and the Environment, 2019). Volunteer groups are supported by catchment bodies and Landcare ACT, which also work with rural landholders and the Ngunnawal community to address NRM issues on public and private land.

Cross-border connections

The ACT NRM Region is defined by the Territory border. The Plan focusses on actions and investment within the ACT, however consideration is required of broader NRM interests and influence beyond the jurisdictional boundary.

The Ngunnawal Nation extends beyond the ACT boundary joining Wiradjuri to the West, Gundungurra to the North, Yuin to the East and the Ngarigo Nation to the South.

The NRM region falls within the Upper Murrumbidgee River Catchment, one of the largest tributaries of the Murray Darling Basin River system. It is part of two bioregions—the South-East Highlands bioregion and the Australian Alps bioregion. As such, the ACT is a key 'crossover' location of nationally important wildlife corridors that link the mountainous corridors of the great divide and the coastal ranges of eastern Australia known as the Great Eastern Ranges. Important inland migratory routes extend through to Central NSW (Western Woodlands Way), the Southern Tablelands (Southern Tablelands Flyway) and the Australian Alps National Parks (ACT Government, 2013).

The ACT NRM Region is bordered by two neighbouring NSW NRM regions, South-East and Riverina, and by four NSW local government areas—Snowy Valley, Snowy Monaro, Queanbeyan Palerang and Yass Valley council areas.

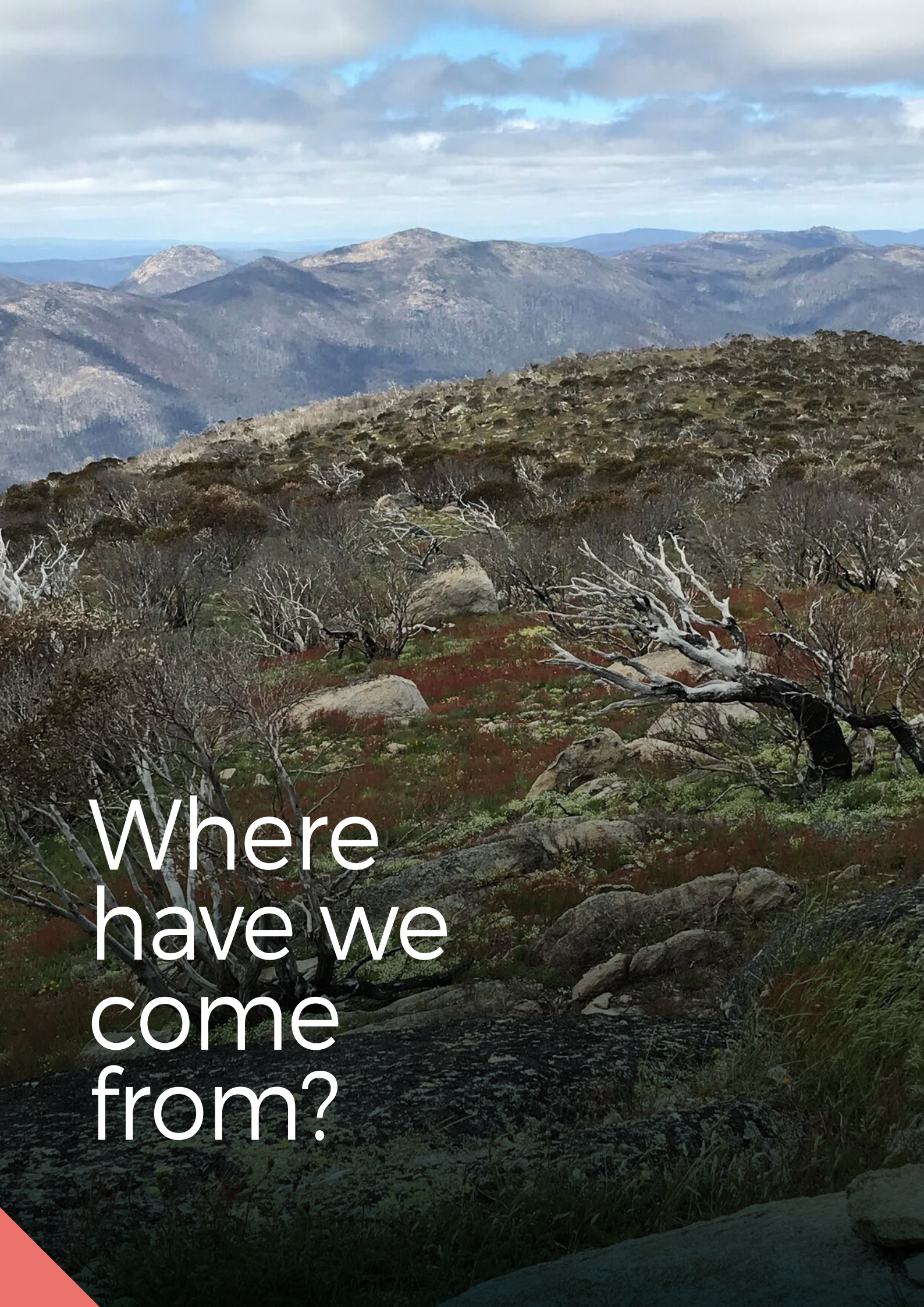
Maintaining and restoring cross-border connections and interactions—ecological and social—are critical for the success of the Plan.

An interjurisdictional coordinating body to strengthen governance and catchment management across the Upper Murrumbidgee Catchment was established in 2014; the ACT and Region Catchment Management Coordination Group (the Coordination Group) is an inter-jurisdictional coordination body committed to strengthening governance and catchment management in the ACT and surrounding regions for the long-term benefit of the ACT and Region. It was established as a statutory body under the Water Resources Act 2007 and is required to report annually to the ACT's Minister for the Environment. Decisions and activities are guided by the ACT and Region Catchment Strategy (ACT Government, 2016).

The Upper Murrumbidgee Catchment Network (UMCN) is a key organisation for networking, learning and discussing natural resource management issues and activities across the Upper Murrumbidgee Catchment. The UMCN provides a strong connection between community groups and government bodies and brings people together across jurisdictional boundaries in clear recognition that NRM issues do not stop at state or council boundaries.

A new cross-border NRM Regional Collaboration Committee is being established by the ACT and NSW governments to:

- establish and maintain relationships between ACT and NSW government NRM agencies
- develop a cross-border NRM Action Plan incorporating priority areas, issues and potential projects across a range of land tenures within the Canberra region
- seek collaborative funding opportunities to undertake cross-border NRM activities
- assist in the management of cross-border NRM issues
- seek out and facilitate the sharing of information between cross-border NRM groups to maximise consistency and best practice.


Where
have we
come
from?

Where have we come from?

NRM planning in the ACT over the last 15 years

Two iterations of the ACT NRM Plan have been developed over the last 20 years; the first launched in 2004 and the most recent plan, Bush Capital Legacy—Plan for Managing the Natural Resources of the ACT, in 2009.

Bush Capital Legacy identified key NRM issues and developed intermediate and long-term targets for community, land, water and biodiversity that guided action and investment. In addition, ACT NRM developed an NRM Investment Plan in 2016 to provide strategic direction for NRM funding across the ACT.

Bush Capital Legacy set 16 broad targets, which have been reviewed (ACT NRM Council, 2009). Of these, seven are considered to have made good progress towards the targets, five have made some progress but still need work, and four need a lot more work. This review is summarised in Appendix 1.

Some areas of progress include:

- extensive on-ground work by ACT NRM, environmental volunteers, rural landholders, Aboriginal groups, schools and other community organisations that has improved environmental health in the ACT
- increased government acceptance of the Ngunnawal people's critical role in NRM, including the application of Ngunnawal ecological knowledge in land management and decision making, and the establishment of the Dhawura Ngunnawal Caring for Country Committee
- formation of the peak Landcare body, Landcare ACT
- continued growth and application of citizen science undertaken by volunteer groups such as Canberra Ornithologists Group, Friends of Grasslands, WaterWatch, FrogWatch and the broader community via the Canberra Nature Map application and other national and international applications such as Atlas of Living Australia, iNaturalist and eBird
- ongoing commitment to protecting and improving the natural environment by environmental volunteers, supported by the ACT Government and catchment groups
- increased recognition of the important role played by a healthy environment in our overall health and wellbeing
- ongoing work by ACT rural landholders to protect their natural resource base in partnership with ACT NRM, Landcare, the catchment groups and government
- continued expansion of the ACT conservation reserve system and the ongoing application of science to on-ground management
- investment in new data to underpin improved NRM planning including soil landscape and hydrogeological mapping
- ongoing Australian Government and ACT Government support and investment for NRM and Landcare in the ACT.

Some of the areas identified in the previous plan that require more work include:

- the prevention of continued fragmentation and decline of important vegetation communities such as Box Gum Woodlands, Natural Temperate Grasslands and riparian areas (including the management of threats such as development, weeds, pests, climate change and fire regimes)
- the broader integration of traditional knowledge into the management of natural resources
- the impacts of the expanding urban footprint and the better incorporation of climate change and biodiversity into land use planning
- the integration of management between government departments
- the potential for carbon and biodiversity trading through the use of a system where land managers can collect credits for undertaking actions that reduce or sequester carbon or enhance biodiversity.

The new Plan builds on and integrates the outcomes, knowledge and experience of previous and existing plans which include: The ACT Nature Conservation Strategy

- ACT Planning Strategy 2018
- ACT Climate Change Strategy 2019–2025
- ACT Water Strategy 2014-2044 (2014)
- Canberra's Living Infrastructure Plan: Cooling the City
- EPSDD Science Plan 2020–2025
- plans to guide conservation of specific ecosystems and species
- plans that address management issues
- plans to govern management of specific sites, including operational plans for nature reserves.

Development of the NRM Plan

The development of this Plan involved extensive community consultation and engagement. See details of that engagement in the companion NRM Plan Listening Report (Appendix 3).

As well as community engagement, the Plan has been informed by:

- a review of the 2009 NRM Plan targets
- the best available science including the 2019 State of the Environment report, which collates the findings of a broad range of research to provide a snapshot of the state of environmental resources in the ACT
- extensive internal government consultation.

Key Focus Areas

The plan proposes that NRM is a fundamental pathway to resilience for both the community and the environment. This is driven by high level principles that are articulated in the key focus areas. Those principles include:

- give a central focus to the rights of Ngunnawal people to care for/speak for Country
- embed recognition of connection to nature as a key factor in the health and wellbeing of all Canberrans
- foster sustainable and innovative management of agricultural landscapes
- conserve, protect and restore the natural environment with a particular focus on threatened ecosystems and species
- maintain and improve ecosystem services in the face of climate change and other pressures
- position the ACT as a leader in environmental governance and community partnerships for environmental outcomes.

The following key focus areas have been identified in the plan, each with specific management objectives, although it is recognised that they are highly integrated:

- Cultural Landscapes
- Community Connection to Nature
- Rural Landscapes
- Urban Landscapes
- Natural Landscapes:
  - Waterways
  - Forest and Woodlands
  - Grasslands
  - Bogs and Fens
- Ecosystem Function and Services
- Governance

Climate change is the largest issue facing NRM management within the ACT. Every aspect of this plan is considered against a backdrop of climate change and, as such, addressed as a pressure within all focus areas.

Cultural landscapes

Cultural landscapes

Definition

The Traditional Custodians of the land and waters of the ACT, the Ngunnawal people, recognise the importance of spiritual connections and cultural obligations to Country. For tens of thousands of years the Ngunnawal people nurtured and cared for Country through, lore/law, ceremony, sustainable land management practices and actively managed the land to influence structure and function of ecosystems. Ngunnawal people worked with their neighbouring Nation groups for shared responsibility of shared boundary areas and waterways.

Vision

Ngunnawal people are recognised as being responsible for caring for Country and speaking for Country, and balance the physical, social and spiritual connection to nature as central to the health and wellbeing of all Canberrans.

Asset

For tens of thousands of years Ngunnawal people have maintained cultural connectivity and deep spiritual links to sites, places, icons and art in the region. Recognition of the Ngunnawal people's right to speak for Country and the acknowledgement and respect for their lore, songlines, custom, language, cultural protocols, land management and cultural practices is critical to the cultural integrity, identity and survival of the Ngunnawal people. In 2002, the ACT Government recognised the Ngunnawal people as the traditional custodians of the ACT and reaffirmed this recognition in 2009.

The Ngunnawal people have strong expertise in landscape management including a knowledge of seasons and sustainable use of natural resources; for example, Yam Daisies, Bogong Moths and yabbies, and taking only what is necessary. They have a well-developed understanding of fire ecology (cool or cultural burning), conservation (locally indigenous flora and fauna species) and water management, in association with their innate responsibility to care for Country (ACT Parks and Conservation Service, 2018).

Looking after Country involves maintaining a balanced physical, social and spiritual environment and contributing to the continuity and renewal of complex relationships between people and the environment (Commissioner for Sustainability and the Environment, 2019).

Condition and trends

Aboriginal participation in NRM in the ACT has grown since 2009. This is reflected in the (ACT Government, 2019):

- finalisation of the Innovate Reconciliation Action Plan (ACT Government, 2019)
- establishment of the Traditional Custodian Engagement within the Environment Division of EPSDD
- establishment of the Dhawura Ngunnawal Caring for Country Committee to provide guidance, direction, advice and decisions on the management of Ngunnawal country
- appointment of a Healthy Country Manager within PCS

- establishment of a Ngunnawal Bush Healing Farm in 2016
- increasing application of Ngunnawal ecological knowledge in land management, assisted by the publication of the Ngunnawal Plant Use book
- Aboriginal Fire Management Framework (2015)
- explicit inclusion of Ngunnawal knowledge and history in ACT K–10 school curricula using 'Understanding the Land through the Eyes of the Ngunnawal People'
- Aboriginal Waterways Assessment and Water Resource Plan (WRP), adopted by ACT Government in 2020 and informed by Aboriginal Waterway Assessment projects, field trips, and community consultation (ACT Government, 2019)
- growing number of Aboriginal staff working in land management and NRM roles including the Ngunnawal Ranger program, which supports the ongoing engagement of Ngunnawal people in the management of Ngunnawal country
- Heritage Act 2004, which established Representative Aboriginal Organisations (RAOs) that are consulted on decisions affecting Aboriginal places and objects. RAOs also provide input into cultural heritage assessments and heritage conservation management plans.

Many Aboriginal-owned businesses have been formed, delivering land management and environmental services.

Pressures

There is still much to do in order to properly integrate cultural land management knowledge into contemporary land management planning and practices. There is a need for better collaboration between the Ngunnawal people and the ACT Government and non-government organisations to manage land and water resources across the ACT and Region, with the goal of shared or co-management of important areas.

Particular pressures include:

- limited cultural understandings by land managers (employees and volunteers) has potential to inadvertenty impact on cultural heritage
- Cultural sites exist on all land tenures in the ACT, rural, urban, reserve and there is not a coordinated approach to enabling Ngunnawal people to care for country
- Challenging administrative systems that are not supportive of Ngunnawal People or relevant organisations in caring for country.

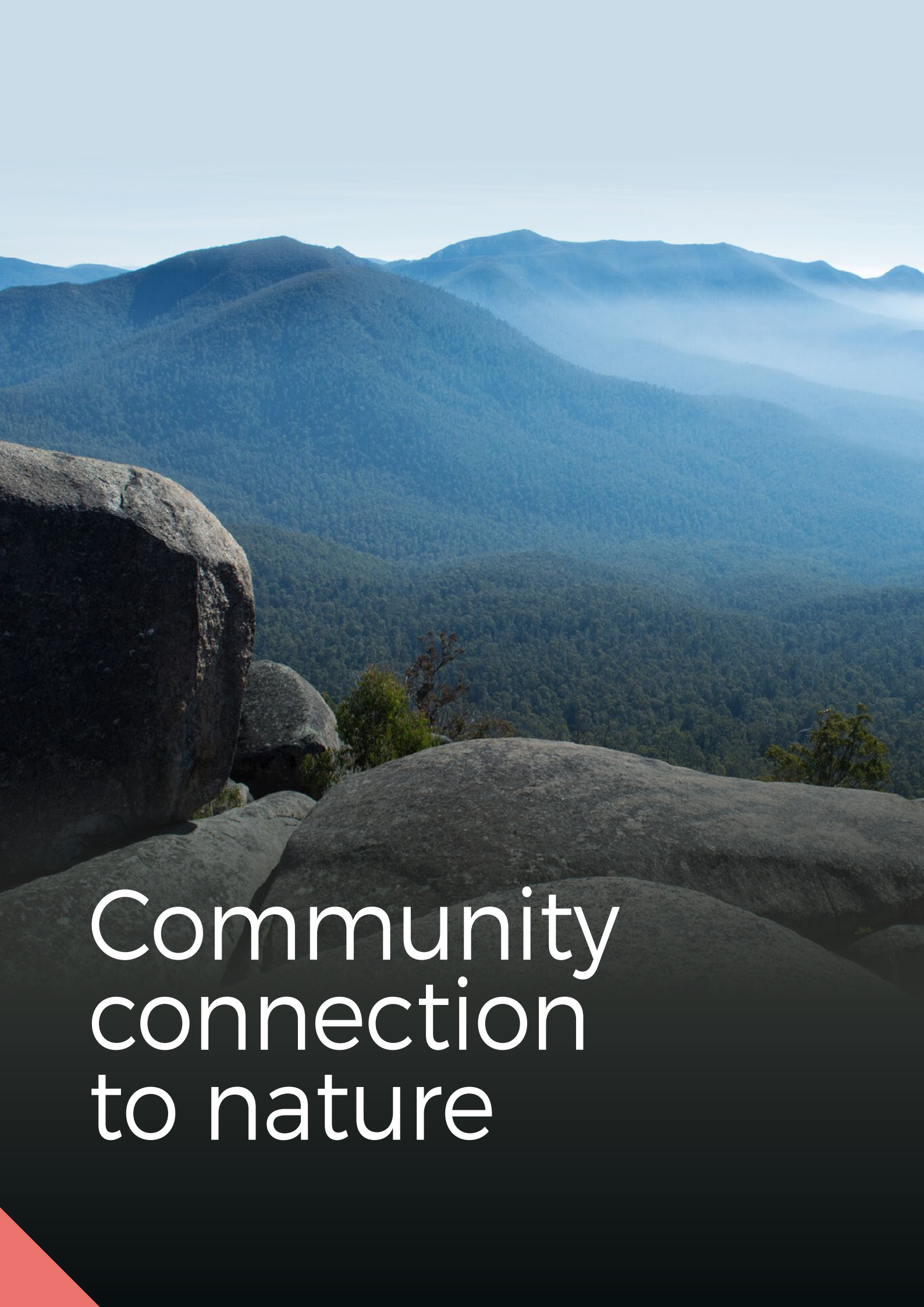
Progress has been made in recent years with the development of Reconciliation Action Plans (RAP) within ACT Government directorates, the Aboriginal and Torres Strait Islander Agreement 2019 - 2028 and the formation of the Dhawura Ngunnawal Caring for Country Committee (DNCCC) within EPSDD, there are many areas for improvement.

Targets and actions

The EPSDD RAP outlines principles for fostering relationships, promoting knowledge, respecting cultural practices, creating opportunities through employment and business development and creating partnerships with traditional custodians. The following targets and actions are based on the RAP's strong, overarching principles. See more information at EPSDD Innovate Reconciliation Action Plan 2019–21.

The ACT Aboriginal and Torres Strait Islander Agreement 2019 -2028 - https://www.communityservices.act.gov.au/atsia/agreement-2019-2028#agreement

Theme	Target	Actions identified during stakeholder consultation
Cultural awareness, training and education	Increase awareness of Ngunnawal culture through regular training, education programs, use of Ngunnawal language.	Provide cultural awareness training for community and Government in the ACT. Support Ngunnawal-led education programs—resources for teachers and community groups to help to inform people about Ngunnawal culture. Promote Ngunnawal language; re-name places, animals and plants; incorporate Ngunnawal language into education.
Land management	Increase involvement of Ngunnawal people in land management activities.	Support collaboration between Aboriginal people, government employees and broader stakeholders in relation to land management activities and decision making. Share responsibilities for land and water with the Ngunnawal community—emphasise co-management or partnership with traditional custodians. Establish systems to ensure Ngunnawal people are involved in land management governance and decision making at all levels. Promote cultural fire management, including more on-ground trials of different fire regimes. Support Ngunnawal people to care for cultural sites. Develop a Cultural Heritage Plan including a Use of Cultural Resources Plan.
Cultural empowerment	Increase Ngunnawal employment, engagement and training opportunities.	Increase employment opportunities for Ngunnawal people to work in the ACT Government. Instigate a River Ranger program to work alongside Ngunnawal Traditional Custodians to track river health. Support the United Ngunnawal Elders Council to lead 'teach and share' knowledge with Ngunnawal youth to develop their understanding of Ngunnawal cultural protocols, lore and governance. Support a 12–17-year-old Ngunnawal Youth on Country leadership group and the Kickstart My Career through Culture Program to attract Ngunnawal youth participation. Engage and support Ngunnawal and Aboriginal and Torres Strait Islander community to participate in NRM events, activities, forums etc. in a culturally appropriate capacity. Provide safe places to implement 'on-Country' cultural learning opportunities with Ngunnawal and wider Aboriginal and Torres Strait Islander community to learn more about Ngunnawal country, people and culture.



Community connection to nature

Community connection to nature

Canberra is known as the Bush Capital of Australia. As such, nature is at the forefront of Canberra's lifestyle, wellbeing, industry and tourism. This is recognised in the ACT Wellbeing Framework (2020), where 'Environment and climate' is one of 12 domains of wellbeing. The framework identifies connection to nature and sustaining the quality of our ecosystems as critical to sustaining the lives of Canberrans." The environment sustains all life now and into the future. Canberra's natural environment sustains all life, is accessible, climate resilient and clean." (CMTEDD, 2020). For more information go to Home - ACT Wellbeing Framework.

Definition

Human connection to the natural environment is crucial for health and wellbeing. A healthy environment is related to an increased lifespan and quality of life; in particular, the quality of our air, water, land and flora and fauna and the ability for people to access and care for our natural environment. This also includes high quality, nature-based experiences that are accessible and inclusive for all, regardless of ability, age, health or mobility.

Vision

A well-informed and engaged community that appreciates, respects, enjoys and cares for the ACT's natural areas, underpinned by strong community stewardship of natural resources.

Asset

People in Canberra value a strong connection to nature; their health and wellbeing are enhanced by access to the natural environment. For Aboriginal and Torres Strait Islander peoples, the relationship to the environment is more profound. 'Country' encompasses an interdependent relationship between an individual and their ancestral lands and seas. Land is a link between all aspects of Aboriginal and Torres Strait Islander peoples' existence—their spirituality, culture, language, family, lore and identity.

Important components of maintaining human connection to the environment include access to green spaces, opportunities for environmental stewardship, tree canopy cover, the quality of air, water and biodiversity. It encompasses ecosystem condition, catchment health, status of threatened species and communities, and reducing threats to the natural environment.

Environmental volunteering is particularly important in Canberra, with a strong network of environmental volunteers. Volunteering benefits the environment—and the volunteers in terms of their social wellbeing; they meet like-minded people, gain work experience and learn new skills. Volunteering encourages people to have stewardship over, and actively care for, their local bushland. Their labour and expertise ensure consistency in monitoring and management over and above that provided by government.

The University of Sheffield said: "Connection with nature is valuable, sometimes life-saving, for people with mild to severe mental health difficulties" (Birch, 2017). The return on investment for nature conservation activities in health has been shown to be more than 8:1 (Bagnall, 2019).

Community stewardship of land reduces the likelihood of neglect and encourages respect for the landscape by others. For example, residents' groups record plants and animals, control weeds, undertake revegetation, remove rubbish, control erosion and raise environmental awareness. Citizen science platforms, including Canberra NatureMap, eBird, iNaturalist, Atlas of Living Australia, FrogWatch, WaterWatch and others promote active and deeper engagement with participating community members and their local environments while providing a critical service in gathering important biodiversity information that can be used by government and non-government agencies for better land management decision-making.

Human connection to nature includes our surroundings, our urban parks and open spaces, gardens, nature reserves and the bush capital landscape. Individual trees and urban forests are an important component of all these landscapes. A healthy urban forest has many wellbeing benefits including (ACT Government, 2021):

- creating local identity and the city's character—the bush capital
- improving community cohesion—green spaces to meet, celebrate and play in
- providing safe inclusive spaces for community environmental volunteering to encourage long-term engagement and commitment for a wider cross section of the ACT community
- encouraging outdoor activity to improve physical and mental wellbeing
- increasing shade to reduce sun exposure, skin cancer and heat-related illnesses
- improving public wellbeing and safety and reducing crime
- impacting child health and wellbeing because access to nature and green space can have a significant positive affect on children's life-long development
- contributing to a healthy economy and cost savings through reduced energy costs—in summer, shaded buildings and infrastructure reduce the need for air conditioning and increase the lifespan of assets such as asphalt (potentially by up to 30%)
- increasing property values—trees in streets enhance neighbourhood aesthetics and increase property values
- decreasing health costs—a healthy green city helps alleviate the burden on national health systems from illness relating to sedentary behaviour, obesity and mental illness
- increasing retail activity—shoppers spend longer in retail areas that are well-treed and landscaped.

Every dollar spent on tree planting and maintenance in cities returns between one and three dollars in benefits (ACT Government, 2021).

Condition and trends

The ACT has the highest volunteering rate in Australia, with 36.8% of our population actively volunteering to help the community. These volunteers contribute more than $1.5 billion to the ACT economy every year (ACT Government, 2018). Volunteer activities provide enriched and extended services that would not otherwise be undertaken. The ACT State of the Environment Report (2019) calculates that $40–50 million per year is contributed to management of the ACT's environment by volunteers across all sectors (Commissioner for Sustainability and the Environment, 2019).

In 2017 the estimated value of volunteer activity in the ACT was more than 22% of total ACT Government expenditure on the environment; and the 2021 Office of the Commissioner for Sustainability and the Environment (OSCE) Environmental Volunteers report calculated this contribution to be over $21.5 million per year in replacement wage costs (Commissioner for Sustainability and the Environment, 2021).

Landcare and other environmental volunteering contribute unparalleled knowledge of the surrounding environment and local species, physical labour (planting, weeding, removing debris), caring for injured wildlife and monitoring and evaluation through citizen science. They administer and manage environmental groups and run activities that include education and awareness-raising about local environmental issues, which encourages

positive practices. Community and government partnerships are well-developed, resulting in positive on-ground outcomes and sound relationships. However, resourcing (funding and support staff) needs to align with on-ground needs. Current grants programs tend to be oversubscribed, which means works can be delayed or staged over many years resulting in some community groups being unable to achieve their goals.

Waterwatch is a good example of a well-developed volunteer citizen science initiative that underpins decisions. More than 200 Waterwatch volunteers measure waterway health, conducting more than 2000 water quality surveys per year that inform Waterwatch's annual Catchment Health Indicator Program (CHIP) report. The 2020 Platypus Month saw a record 300 volunteers assist with 34 group surveys to help better understand platypus numbers in the ACT region.

The ACT benefits enormously from the location and easy access to key environmental research bodies in the ACT including CSIRO, Australian National University, University of Canberra, University of NSW and the Canberra Institute of Technology. Many scientists and other specialists from these institutions are also active in Landcare and environmental volunteering. Non-government groups are instrumental in providing additional engagement, advocacy, technical and voluntary support including the Canberra Ornithologists Group, Friends of Grasslands, National Parks Association, Conservation Council ACT Region and Greening Australia, to name a few key organisations.

Pressures

Our wellbeing and resilience will be challenged as we continue to adapt to a changing climate and higher temperatures, more extreme weather events, increased bushfire risks and longer, harsher seasons. It will be exceedingly important to promote community connection with the environment and to prioritise and innovate a wide-ranging suite of adaptation strategies. Priorities such as vegetation and trees in the urban landscape and the retention of connectivity of vegetation across all land tenures will become increasingly important.

Chronic disease is the most significant emerging health burden the ACT is currently facing. Abundant evidence demonstrates that nature is a key determinant of health and that contact with nature is beneficial for human health: physically, mentally, socially and spiritually. Younger people, those identifying as LGBTIQ+, those with children aged 0–4 years and the unemployed are more likely to walk in green spaces in a usual week than other Canberrans on average. Data on access to green spaces shows that in December 2019, 92.5% of Canberrans reported having good access to nature opportunities and 93.4% reported easy access to a nature reserve from their home (ACT Government, 2020).

A Nature Prescriptions project is currently being developed by the ACT Government that brings together health providers and environmental professionals to encourage and facilitate time in nature for those experiencing, or at risk of developing, chronic health conditions. The concept for the Nature Prescriptions Project draws from best practice models including Park Prescriptions America (Parks Rx) and New Zealand's Green Scripts.

The project will be complemented by a suite of nature-based activities developed to provide opportunities to engage with nature at a level suitable for each participant. Environmental volunteering would be an important component of this.

Targets and actions

The ACT Wellbeing Framework has been developed by the ACT Government to understand how people and our environment are doing over time. This includes measurements on greenhouse gas emissions, community resilience, community preparedness for climate change and residual risks from extreme weather events to both life and property and the environment (ACT Government, 2020). Although this framework covers 12 domains, environment and climate are identified as important focus areas.

Theme	Target	Actions identified during stakeholder consultation
Sustainable nature-based recreation	Increase opportunities for nature-based recreation.	Develop infrastructure for nature-based recreation. Develop a system for commercial activities in nature reserves.
Connection to nature	Increase opportunities for people to connect with nature for wellbeing.	Encourage use of green spaces by people of all ages and provide spaces that are inviting and sought after, including waterways. Encourage involvement in landcare activities by people of all ages. Establish a nature prescription project that works with health professionals to encourage and facilitate time in nature for those experiencing, or at risk of developing, chronic health conditions, including a suite of nature-based activities and volunteering opportunities.
Community looking after the environment	Increase opportunities for volunteering for the environment.	Resource volunteering opportunities for under-represented groups such as Aboriginal and Torres Strait Islander people, culturally and linguistically diverse people, LGBTIQ+ people, people with a disability, older Canberrans and carers. Introduce new and innovative volunteer engagement strategies to involve youth in nature conservation. Develop programs that link landcare activities with improvements to mental health that target isolated individuals and specific groups such as veterans. Ensure that existing volunteer groups and the catchment groups are appropriately supported. Improve coordination between Government and community based organisations to streamline volunteering and improve opportunities for community stewardship of public land. Review the environmental grants program to facilitate greater volunteer engagement and align on-ground priorities and needs with funding opportunities. Increase the ACT Environment Grants budget to recognise and address persistent oversubscription each year. Develop co-designed community–government maintenance programs to ensure the upkeep of volunteer-led projects.

Rural landscapes

Rural landscapes

Definition

Rural land in the ACT is leasehold and zoned as NUZ1 and NUZ2 (ACT Government, 2021). The objectives of the zonings include:

- conserve the distinctive rural landscape setting of Canberra and maintain ecological integrity
- conserve wildlife habitat to adequately protect native plant and animal species
- make provision for the productive and sustainable use of land for agriculture
- make provision for other uses that are compatible with the use of the land for agriculture
- ensure land parcels are appropriate in size for their approved uses
- offer leases for time periods that reflect planning intentions for the locality
- einforce a clear definition between urban and rural land.

Vision

Well-supported ACT land managers ensure maximum productivity and profitability in an ecologically sustainable way while protecting important ecosystems.

Asset

Rural land in the ACT provides a distinctive landscape backdrop for the city and productive and sustainable agriculture; it helps to conserve important habitat and species. The Territory's farming families collectively manage 40,000ha (15%) of the ACT, mainly for the production of beef, lamb and wool, as well as horse agistment and equestrian activities. Other enterprises include free range eggs, chickens, alpacas and llamas, fruit and vegetables, wine, olives and truffles.

Landholders play an important role in land stewardship and protection of natural values on rural lands, which include more than 40% of lowland woodland communities and many of the ACT's waterways. Most landholders contribute considerable time and expense to protect these natural values and integrate them into farm management. Landholders also play an important role in bushfire reduction and mitigation through strategic hazard reduction grazing.

Condition and trends

The ACT Government has a range of programs that support rural landholders to sustainably manage the land in their care. This includes access to up-to-date and locally relevant information, tools and technology, and connecting landholders to networks to share knowledge and experiences. Examples include Landscan, Better Soils Better Lands, Prograze, Regenerative Agriculture and specific topic training such as pests, weeds, plant identification, climate change adaptation and so on. Climate change poses an all-encompassing threat to the natural resources of the ACT; however, there are other new and emerging threats to be addressed including deer and the incursion of weeds such as Chilean Needlegrass, African Lovegrass and Coolatai Grass (previously not seen in the ACT).

Land Management Agreements (LMA) are put in place as part of leasehold arrangements to help landholders manage their land sustainably with respect to natural values. These agreements are a requirement of leasing rural land in the Territory, although some areas such as landholder contribution to bushfire hazard reduction have not been formally incorporated into LMA to date.

The ACT is currently preparing the Capital Food and Fibre Strategy, which will provide a roadmap for a sustainable, resilient, innovative and secure agricultural system for the ACT and Region. The strategy will be followed by a detailed implementation plan with specific actions, goals and monitoring and evaluation processes.

Pressures

The pressures facing rural lands include:

- biosecurity (weeds and pest animals) including existing risks and emerging risks. The ACT Biosecurity Strategy 2016–2026 outlines how weeds and pest animals are managed in the ACT
- loss of groundcover causing gully, sheet and streambank erosion
- soil acidification
- loss of soil carbon

- drought and climate change, with more frequent and longer lasting dry periods, increased frequency and intensity of storms, heatwaves, bushfires and reduced stream flows
- inappropriate fire regimes that don't properly consider the impacts on ecological values
- loss of biodiversity, particularly in fertile Natural Temperate Grasslands and Box Gum Woodlands
- lack of a sound agricultural policy that incorporates food security, regional planning, farm diversification and succession planning for future generations
- urban expansion and peri-urban impacts
- water security—this is broader than water quantity; it also considers water quality and accessibility. This is a cross-border issue given water supply (quantity and quality) in the upper parts of the Murrumbidgee is dependent on the NSW Water Sharing Plan for the Unregulated Murrumbidgee water source and the Snowy water licence.

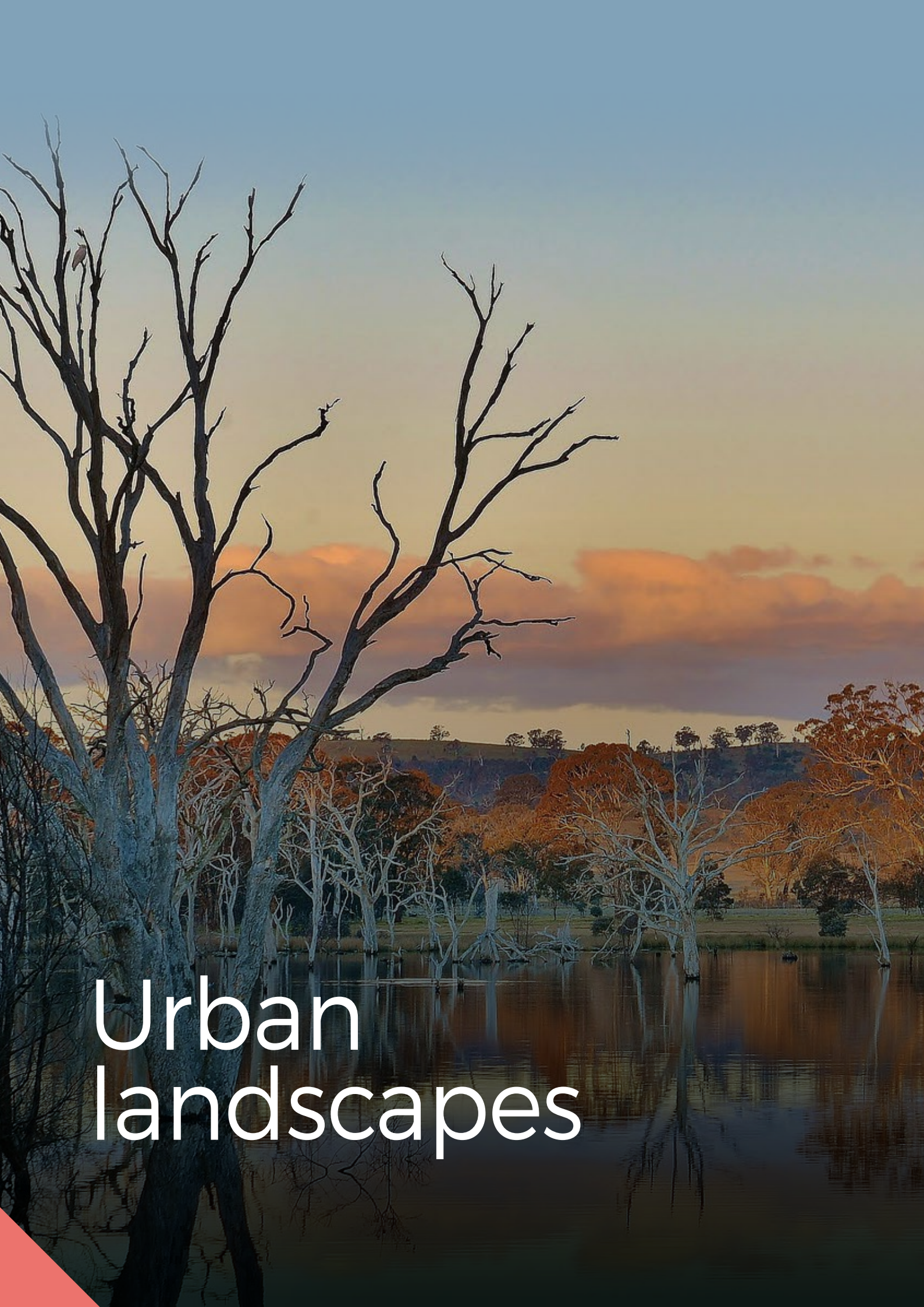
In some localities, rural areas act as a land bank for future urban development. Time frames of rural leases reflect future development plans and provide a degree of security of tenure for rural landholders (EPSDD, 2021). However, proposed future changes to the rural landscape can influence land management activities, promoting a focus on short-term outcomes rather than long-term sustainability. Landholders are unable to confidently invest in their businesses and may not be able to get financial support for proposed activities. This can increase the risk of poor land management practices.

Targets and actions

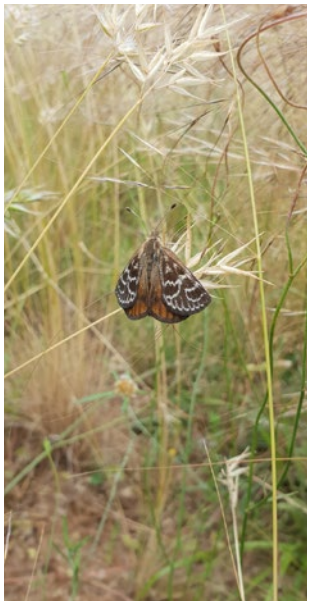
Theme	Target	Actions identifies during stakeholder consultation
Land management and tenure policy	Improve policy and tenure arrangements to maximise sustainable management of land into the future.	Determine the future intent of agriculture and rural lands in the ACT and, if appropriate, retain the current 15% of land area in the ACT as rural land into the future or set another benchmark level if not appropriate. Review LMA to ensure they are fit for purpose to conserve key ecological values and align with initiatives for farm diversification and sustainable land use. Implement effective monitoring and enforcement of LMA to ensure the sustainable management of rural lands. Explore land tenure arrangements to maximise the opportunity for sustainable farm management. Review the system for identifying areas of rural land as 'land banks' for potential future development (in relation to the broader planning strategies for agriculture and urban infill). Introduce new land use zone development controls in the Territory Plan, with protection of areas of important landscape setting or nature conservation values or areas of value for connectivity corridors or as buffers to adjacent areas with greater values. Remove change-of-use charges to rural and broadacre zoned land where the main activity is to produce food or fibre. Investigate opportunities for supporting the protection of important environmental assets on rural lands through land stewardship programs. Promote understanding of and opportunities for regenerative agriculture.

Theme	Target	Actions identifies during stakeholder consultation
Agricultural policy and practice	Improve policy to govern rural lands management in the ACT.	Develop integrated rural lands and agricultural policy that ties together all aspects of sustainable land management—natural, cultural and social values. Define the regional boundary line(s) for bio-regional ecosystems—producers' and retailers' produce forms part of broader National Capital Region marketing. Develop a buy-local produce scheme and promote the region as a food bowl for Canberra. Provide resources and forums to encourage collaboration between farmers, government and industry to address common concerns. Provide timely access to current knowledge to ensure landholders can implement changes within an adaptable framework and provide support for them to do so. Invest in urban–rural connection programs to encourage greater volunteering opportunities and increased agri-tourism. Ensure that the Capital Food and Fibre Strategy and its implementation plan consider the important issues and potential actions outlined in this Plan. Implement the Regional Drought Resilience Plan Cultural heritage values of rural landscapes are conserved and protected Opportunities for Aboriginal people to be involved in agri-business.
Agriculture production diversified and increased	Food security and economic viability of the agriculture sector enhanced	High quality agricultural land conserved for production Determine area of viable agriculture land for the ACT Support control and containment of critical agriculture pest species Agriculture extension activities target land health and product diversification.
Biosecurity	Improve management of biosecurity issues (weeds and pest animals).	Improve collaborative biosecurity planning across all land tenures and coordination between agencies and lessees. Prepare for new and emerging biosecurity risks. Provide incentives, trials and demonstrations to support landholders to implement best practice control of existing biosecurity threats (weeds and pest animal).
Fire management	Improve rural lands fire management.	Invest in cultural burning on rural lands in partnership with the Ngunnawal community. Confirm the role of rural land management activities in relation to fire mitigation. Coordinate fire suppression and hazard reduction activities in association with environmental and production outcomes (rural fire brigades and community connection).
Climate change	Improve resilience to climate change.	Progress opportunities for carbon and biodiversity trading. Investigate diversification activities including emerging business and marketing opportunities. Explore the application of sustainability frameworks.

Theme	Target	Actions identifies during stakeholder consultation
Water management	Improve Water Security.	Investigate measures for improving water security, including water trading, water allocation, water pricing and increased water savings through greywater investment and incentives for reduced water use of farms. Manage agriculture-related sedimentation and eutrophication of waterways through soil erosion and grazing management activities. Support leaseholders to manage riparian areas and erosion via off-stream watering points, fencing, revegetation and other activities.
Soil and Groundcover Management	Improve soil health and increased production.	Increase native perennial pasture cover for optimal production and increase plant diversity to promote healthy soil biota. Promote groundcover at 80% or better in rural landscapes regardless of season. Encourage use of tools such as online stock and feed budgets, weather and climate forecasting, landscape mapping, incentives and expert advice. Investigate soil carbon trading through national initiatives. Continue and increase the range of successful programs to support leaseholders to manage their land sustainably to ensure healthy farm ecosystems and improve productivity and farm income.
Native vegetation and biodiversity	Connect, protect and enhance native vegetation.	Maintain and improve biodiversity, native vegetation and wildlife across rural landscapes through combination of protection, restoration and reconnection. (Biodiversity Network) Include paddock trees, connectivity plantings and management of dieback (research and revegetation) as focus areas. Prioritise further research and on-ground trials for areas experiencing eucalypt dieback. Build capacity and incentives for continued on-ground action, along with trials and demonstration projects. Investigate voluntary stewardship agreements or covenants to acknowledge the role of rural lessees in protecting biodiversity
Dumping of building waste and extractive Industry	Improved management of dumping of building waste.	Ensure building waste (such as soil and rock) directed from building sites in the ACT to rural land is approved for the purpose of improving rural land management such as road maintenance, bank stabilisation, erosion control and so on. Ensure that material removed from building sites for re-use meets the criteria for Virgin Excavated Natural Material (VENM). Support transparency in environmental authorisations issued by the Environment Protection Authority (EPA).



Urban landscapes



Urban landscapes

Definition

The term urban refers to a region or area which is more densely populated and possesses the characteristics of human-made surroundings.

Vision

The integration of the urban and natural environment, through 'rewilding' (IUCN 2021), to prioritise environmental values, wellbeing and ecosystems service in the face of climate change in the ACT as the Bush Capital.

Asset

Urban land use comprises 17% of the land area in the ACT (ABARES, 2016)Urban development is guided by The Territory Plan which is a statutory document which aims to provide residents with an attractive, safe and efficient environment in which to live. Several policies and strategies inform the Territory Plan such as the Australian Government's **National Capital Plan** (NCP) and the **ACT Planning Strategy**, which set out broad objectives for future planning. The **Planning and Development Act 2007** (the Act) outlines the object, format, content and review processes of the Territory Plan. In accordance with the Act, the Territory Plan guides environmental impact statements, planning reports and strategic environmental assessments. The ACT NRM Plan has been developed with respect to these strategies and policies.

Canberra's urban forest

Canberra's urban forest comprises areas such as small parks, green buildings and green neighbourhoods that not only provide green space for people, but also provide habitat for wildlife. More specifically, urban trees support a wide range of plants, animals, insects and microorganisms, foraging areas, shelter, shade, roosting, nesting and movement opportunities. Remnant hollow-bearing trees provide critical habitat and breeding sites and urban remnant and planted trees, whether native or exotic, are important for ecological connectivity. Fallen wood from trees in parks and reserves also provides valuable habitat for wildlife.

Public land within the urban areas but outside the Canberra nature park system is managed by the Transport Canberra and City Services Directorate (TCCS). These areas include:

- corridors for pedestrian movement within and between suburbs
- semi-natural open spaces such as lakes, creek corridors, hilltop areas, ridges and buffer areas between suburbs
- native grassland or woodland sites, some of which may contain threatened or otherwise significant plant species and provide habitat for a wide range of fauna species, some of which are threatened or significant
- artificial wetlands and Healthy Waterways infrastructure
- major road verges and medians (including street trees)
- informal use ovals—non-irrigated grass areas used for informal sport and recreation
- large open spaces dedicated to specialised recreational activities or sporting events.

Whilst primarily managed for urban utility/amenity purposes, this land often contains areas of high environmental value including excellent examples of critically endangered Natural Temperate Grassland and Box Gum Woodland. These spaces not only provide important habitat connectivity through our suburbs between the reserves, but they also underpin human wellbeing and urban amenity.

Canberra's urban reserve system

Canberra Nature Park, managed by the ACT Parks and Conservation Service (PCS), is incorporated into the city's design as the Bush Capital. It comprises more than 40 nature reserves embedded in the urban footprint. These reserves contain some of the best examples of critically endangered Natural Temperate Grassland and Box Gum Woodland left in Australia.

The grasslands, woodlands and forests of Canberra Nature Park are rich ecosystems; many species have regional and national conservation significance, such as the Superb Parrot, White-winged Triller, Striped Legless Lizard, Grassland Earless Dragon, Canberra Spider Orchid and Button Wrinklewort. The reserve system supports the movement of wildlife through urban Canberra to national parks and reserves in the broader region. Canberra Nature Park and other ACT reserves are governed by management plans that outline values and management actions, with ecological values protected as the highest priority.

A network of offset reserves has been set aside to compensate for some of the impacts of urban development. These protect high conservation value landscapes in perpetuity. Offset reserves have grown from 18 ha in 2009 to 2301.4 ha in 2022, with 1996.81 ha managed by the ACT Government, which accounts for 16.1% of the ACT's urban reserve areas (ACT Government, 2022).

Biodiversity in backyards

Biodiversity conservation in backyards is an increasingly important focus area for conservation, particularly the selection of appropriate plants for gardens that support pollinators and enhance biodiversity. Backyards also provide linkages between reserves for flora and fauna. Programs such as Habitat for Wildlife, the ACT Cat Plan, Actsmart's Climate-wise Gardens and Weed Swap are important and practical components of raising environmental awareness in the community.

The urban wetlands and lakes and waterways

Wetlands, lakes and waterways are found throughout the urban areas of Canberra. They provide excellent biodiversity ecosystem function and community connection. Further detail about these areas is provided in other focus areas.

Condition and trends

While there is some detailed information regarding focal areas (primarily urban grasslands from the ACT Grassland Strategy), there is little information about condition and trends of non-protected areas in the ACT overall. This is significant because the majority of grassland remnants in the ACT are not contained within nature reserves and only 35% of remnant vegetation is protected (ACT Government, 2017).

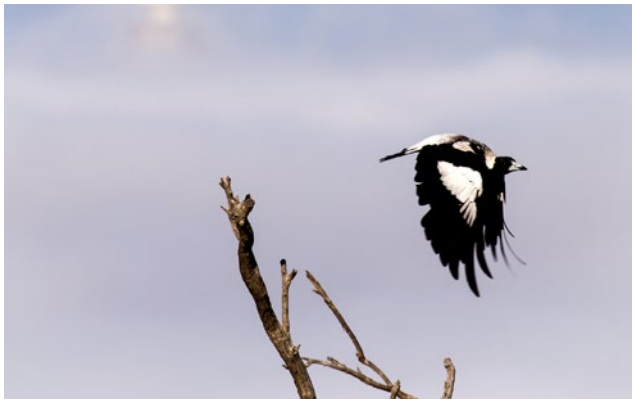
The ACT Government is implementing initiatives to fill some of the knowledge gaps regarding biodiversity assets in urban areas. Creating and maintaining habitat connectivity through Canberra's urban space is an important part of conserving native plant and animal populations. One initiative, the Urban Connectivity Project, will deliver an interactive platform to guide planning, development and restoration decision-making and, in turn, support enhanced habitat connectivity for urban wildlife. This will feed into the development of a spatial planning tool that will broadly follow the Linking Nature in the City framework developed by the City of Melbourne. This framework maps the basic structural and functional habitat requirements, dispersal capacity and functional barriers for key species groups to enable planning for current and future wildlife connectivity routes (NSW OEH and UNE, n.d.). These linkages could be formally designated by applying the IUCN World Commission on Protected Areas' standards and guidelines for protected area categories, "Other Effective Area-based Conservation Measures", and "Guidelines for conserving connectivity through ecological networks and corridors.

Work is underway to rewild Canberra to create a city where nature is valued and treated as an essential element of a prosperous and healthy society, with space provided for wildlife and natural processes. Canberra, as the Bush Capital, has many wild areas already and is well positioned to expand on this concept. Canberra can be a city where people are connected to and value all aspects of nature that provide such critical ecosystem services. This includes wild rivers, urban biodiversity, living infrastructure and integration of nature into development.

The Urban Forest Strategy 2021–2045 (ACT Government, 2021) includes the vision of 'a resilient and sustainable urban forest that supports a liveable city and the natural environment and contributes to the wellbeing of the community in a changing climate'. The strategy aims to achieve this vision through six major objectives:

1. Protect the urban forest
2. Grow a resilient forest
3. Balance and diversify the urban forest
4. Take an ecological approach and support biodiversity
5. Develop infrastructure to support the urban forest and liveability
6. Partner with the community to grow and maintain the urban forest

For example, significant benefits can be realised where the existing exotic grassy groundlayers surrounding remnant trees are replaced with native understorey plants; retaining or placing large rocks and branches in such sites can improve ecosystem function, increase wildlife habitat and attract more birds, increase localised cooling and amenity and reduce maintenance routines. 'No mow' zones can allow natural regeneration, supported by additional volunteer planting and maintenance activities. This is especially appropriate in open space areas providing connectivity to nature reserves (ACT Government, 2021).



Other plans and strategies that outline condition, targets and actions relevant to the vision for NRM in the urban environment include the ACT Climate Change Strategy (ACT Government, 2019), the ACT Planning Strategy (Section 3) (ACT Government, 2018),the ACT Wellbeing Framework (ACT Government, 2020), Building a Biodiversity Network Across the ACT, (Conservation Council ACT Region; Friends of Grasslands 2022)

Relevant focal areas include:

- a healthy and resilient natural environment
- connection to nature
- a climate resistant environment and community
- personal wellbeing
- a liveable city
- health, including mental health and a healthy lifestyle
- connection to Canberra
- valuing Aboriginal and Torres Strait Islander cultures and recognising traditional custodians
- volunteering.

Over the course of the consultation process for the development of this Plan there was a consistent theme from both government and community stakeholders that a range of government policies, plans and requirements could be contradictory to each other due to varying priorities or focus. Management of the natural and urban environment needs to be better integrated to support ecosystem function and human wellbeing outcomes.

Pressures

Urban development increasingly threatens flora and fauna through removal and fragmentation of suitable habitat, which results in reduced habitat connectivity for wildlife and increased competition and predation from exotic species (ACT Government, 2021).

If Canberra's current pattern of urban development continues unchanged, the urban footprint will be required to expand by almost half to accommodate estimated population growth. An expansion of this size would increase our travel times, decrease sustainable transport options and increase our ecological footprint, as well as increase loss and fragmentation of agricultural land and environmentally sensitive areas (Commissioner for Sustainability

and the Environment, 2019). The urban land footprint expanded by 57% between 1991 and 2016; there is the potential for it to increase to around 25% of the land area of the ACT by 2041 under current development rates (Commissioner for Sustainability and the Environment, 2019).

To alleviate this urban sprawl, the ACT Government has set a target of 70% for new construction to occur as infill within existing urban areas (currently at 58%). If this infill target is met, there will be a 15.1% increase to the urban footprint required (429km^2) by 2041. (ACT Government, 2018) While addressing urban sprawl, there are still implications associated with urban intensification, particularly the reduction of open areas for recreation and semi-natural and natural green spaces important for urban wildlife. Urban infill also tends to encourage a greater proportion of urban residential blocks to be taken up by their houses' footprints.

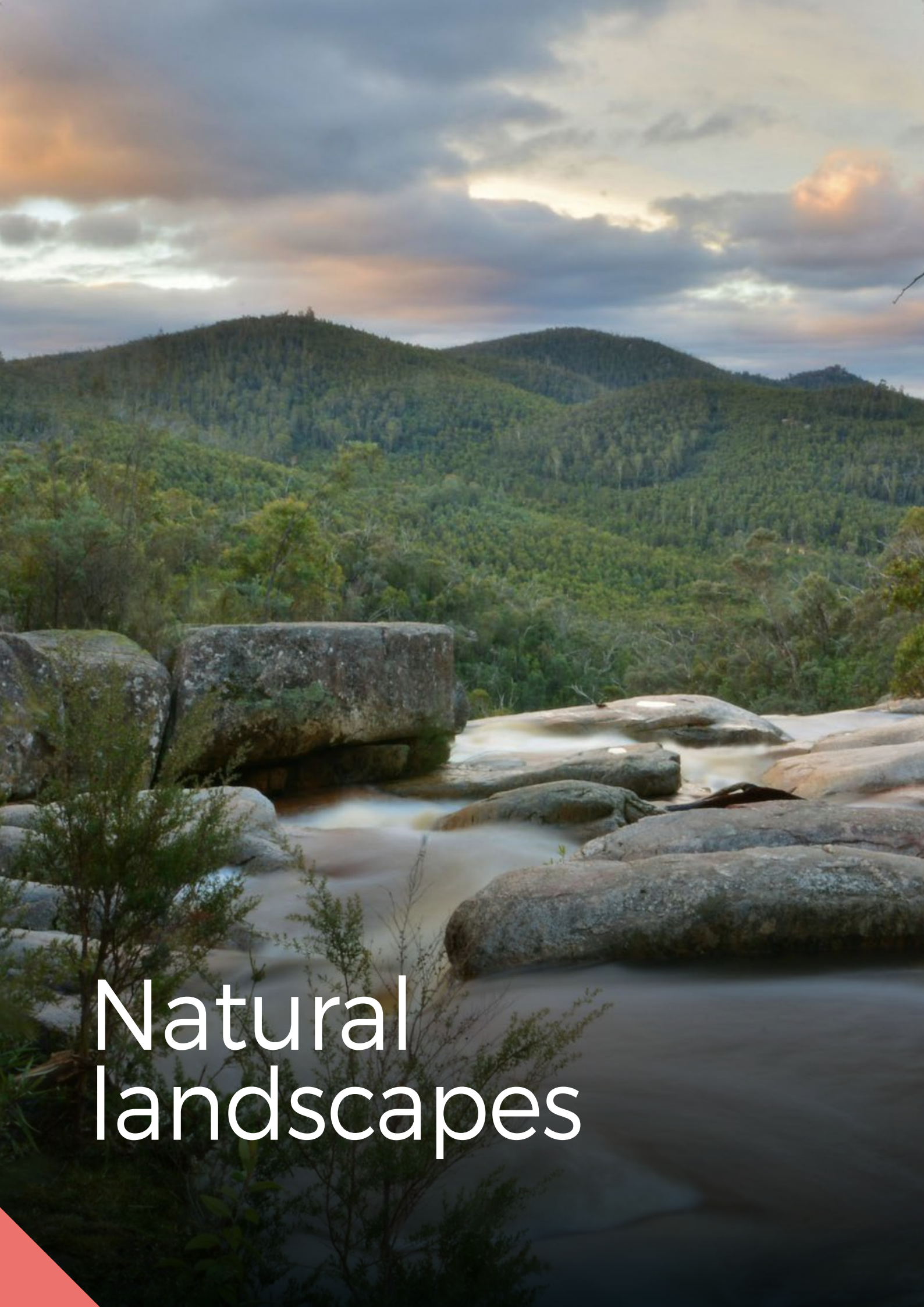
Increased pressures from human activities as more people move into new areas include:

- high levels of recreational use (areas are 'loved to death')
- cats and other domestic animals and their impacts on wildlife and ecosystems
- weed escapees from suburban gardens and widespread weeds like African Lovegrass
- prolific use of garden species that provide greater support to a range of problem or pest species that impact or outcompete rare native species
- water quality impacts—polluted run-off, fertiliser, dog droppings, oils, detergents and leaf litter, sediment run-off from tracks, trails and areas undergoing significant residential construction activities
- understorey clearing for fire protection
- manicuring and mowing to create park-like open space
- compaction of high-use areas from walkers and illegally parked vehicles
- light pollution
- noise pollution
- incremental clearing and habitat loss including of mature and especially hollow-bearing trees
- wildlife interactions with people; for example, vehicle collisions with kangaroos and aggressive magpies.

In 2010, more than half our public trees in the urban area were classed as mature. While older trees have critical habitat features that need to be protected, it also means that more than 55% of trees in streets and parks are likely to reach the end of their life over the next two or three decades. Just as importantly, the number of young trees in Canberra's public urban forest in 2010 is less than one-third of the industry standard for an optimal age profile. The low number of young trees means Canberra's urban footprint has insufficient young trees in place to maintain existing canopy cover as our ageing trees decline and are removed (Commissioner for Sustainability and the Environment, 2019).

Targets and Actions

Theme	Target	Actions identified during stakeholder consultation
Prioritisation and planning	Increase the area of protected urban open space and the land and infrastructure that connects them.	Implement the Urban Connectivity Project including a prioritisation framework for the protection, conservation and restoration of green spaces and align it with other priority projects such as Healthy Waterways, Urban Forests, Active Travel and Living Infrastructure. Incorporate initiatives such as Biodiversity Sensitive Urban Design principles and Cities for People and Nature (which outline methods for prioritising spatial arrangements of new habitats, identifying successful urban conservation actions that incorporate biodiversity into urban planning). Identify and rectify contradictions in current government policies, procedures, laws and regulations. Recognise the importance of living infrastructure for protecting and enhancing biodiversity and as a buffer against the impacts of climate change including heat island effect. Progress work to ensure lands of high conservation value outside the reserve system are protected including voluntary stewardship or custodianship agreements. Collaborate with other jurisdictions and research institutes to generate an evidence base for urban tree, understorey groundlayer, wetland fringe and other appropriate plantings, with a specific focus on climate change implications.
Management of urban biodiversity	Establish a well-managed well-connected biodiverse series of corridors across the ACT's urban area.	Develop and implement strategic ecological assessments of all off-reserve land to ascertain its conservation value. Rebuild biodiversity across urban areas, integrating cross-tenure NRM principles. Undertake further investigation into the role and risks to threatened fauna, pollinators and soils in the urban space. Investigate the feasibility of reducing the area of land mown for amenity and/or reduce the frequency and height of mowing to encourage a more biodiverse ecosystem. This would need to be underpinned by a community awareness program and would also reduce the costs of mowing. Ensure ecologically sensitive hazard reduction burning and expand ecological and cultural burning. Manage biosecurity risks across the urban environment Continue to implement the ACT Cat Plan, including the cat containment provisions.
Community collaboration	Increase public awareness of, and participation in, environmental management.	Support an engaged and environmentally aware urban community and provide opportunities for further involvement in management and enhancement of the urban environment. Expand communication around biodiversity and environmental issues including ensuring biodiversity reports are made available to community. Promote community connection to, and stewardship of, natural areas through programs like adopt-a-park. Communicate the importance of ecosystem services in the urban environment including urban cooling and amenity and fresh air and water.



Natural landscapes

Natural landscapes

The ACT has a variety of natural landscapes including steep forested hills, the sparse open woodlands and treeless grasslands of the valley slopes and floors, a variety of wetlands, rivers and creeks, and important alpine wetlands. The ACT is situated in two bioregions—the South-Eastern Highlands bioregion and the Australian Alps bioregion. Within those bioregions there are four major landscapes including forests and woodlands, bogs and fens, grasslands and waterways. The overarching issues for these natural landscapes are loss of biodiversity and inappropriate fire regimes.

The southern half of the ACT is in the Australian Alps bioregion. The higher elevations lie almost entirely within Namadgi National Park and Tidbinbilla Nature Reserve. The sub-alpine, montane, wet and dry forest communities that occupy this part of the ACT are part of a much greater continuous network of alpine parks that include Kosciuszko National Park and the Victorian Alps. Park agencies in New South Wales, Victoria, the Australian Capital Territory and the Commonwealth Government work together under the Australian Alps national parks banner to manage 1.6 million hectares of the alpine region in recognition of its significance as a single biogeographical region. The scale and connectivity of this reserve network and cross-border relationships between the NSW, Victorian and ACT governments ensure protection of ecosystem function and plant and animal diversity (ACTGovernment, 2013).

The rest of the ACT is lower in altitude and forms part of the South-Eastern Highlands bioregion. Around 60% of the ACT's lowlands have been cleared but key vegetation remnants have been retained in conservation reserves. Ongoing urban expansion has fragmented these remnants and led to deterioration in their condition. Significant threatening factors include weed and exotic animal invasion, inappropriate fire management, recreation pressures and continuing urban expansion. The overuse of chemicals (including pesticides, soil ameliorants and fertilisers) can also have significant impacts on biodiversity, especially insects and soil biota, which are critical for functional food webs, pollination and natural pest control. Climate change will impose additional pressures on natural landscapes causing a restriction in the available habitat and optimal seasonal conditions for a range of flora and fauna, particularly threatened species with small distributions and/or a narrow range of climate tolerance levels (ACT Government, 2013).

Biodiversity conservation

The ACT has 52 threatened species including three key threatened ecological communities:

- Alpine Sphagnum Bogs and Associated Fens ecological community
- Natural Temperate Grassland of the South-Eastern Highlands
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands

Vegetation communities provide homes for most threatened plants and animals and are under pressure from a range of threats. The 2019 ACT State of the Environment Report notes that grassland and woodland vegetation communities are the least represented in conservation areas. Only 50% of the Box Gum Woodland communities and 30% of Natural Temperate Grassland communities are protected in reserves and therefore management of these communities outside conservation networks is paramount.

All habitat types in the ACT are important for biodiversity, including remnant, modified and vegetation in urban areas. Connectivity is critically important within the landscape as well as between different landscapes. Sound management of biodiversity will prevent further habitat loss so common species do not become threatened in future. In particular, support of important ecological processes such as seed dispersal, post breeding dispersal of fauna, maintenance of nutrient and energy cycles, long-term adaptation and evolution, interactions between symbiotic species, predator-prey relationships and pollination of plants. It is also important that fuel reduction

burns consider ecosystem and biodiversity requirements to ensure ecologically appropriate burning is undertaken. However, this can be difficult where property and asset protection is the main purpose of fuel reduction.

Ecological connectivity,defined as the unimpeded movement of species and flow of natural processes that sustain life on Earth, (IUCN 2020), is necessary for the functionality of ecosystems, is key for the survival of animals and plants and is crucial to ensuring genetic diversity and supporting adaptation to a changing climate, allowing species to adapt and shift across the landscape. Landscape scale restoration of ecological connectivity will support ecosystem function across the ACT and Region.

The International Union for the Conservation of Nature (IUCN) World Commission on Protected areas have published standards and guidelines to protect the ecological connectivity of nature including"Recognising and reporting on other Effective Area-based Conservation Measures" (2019) and the Guidelines for conserving connectivity through ecological networks and corridors (2020). The Conservation Council ACT Region and Friends of Grasslands have developed "Building a Biodiversity Network Across the ACT" (2022) a guide on how this could be applied in the ACT.

Natural landscapes of the ACT for the purposes of the NRM Plan include:

- waterways
- bogs and fens
- forest and woodlands
- grasslands.

Waterways

Definition

'A water course that is covered permanently or intermittently by water and includes the water in the channel, substrate, and plants and animals that are completely or substantially dependent on being covered by water'. The riparian zone is defined as 'an area of terrestrial land that affects, and is affected by, flowing water of the adjacent water body' (ACT Government, 2018).

Vision

The ACT's rivers and wetlands are healthy and well managed to support environmental, social, cultural and economic values, and can be enjoyed by the whole community.

Asset

The Murrumbidgee River and its tributaries define the aquatic, geomorphic, hydrological and ecological features of the ACT. The main tributaries of the Murrumbidgee in the ACT are the Cotter, Paddy's, Molonglo, Gudgenby and Naas rivers.

Despite water being highly valued as a resource in the ACT, many aquatic areas are in poor condition from an ecological perspective. Aquatic habitats have been highly modified since European settlement through the clearing of riparian vegetation, changes to hydrology, increased sedimentation, reduced water quality and introduction of pest fish species (ACT Government, 2018). The natural flows of most river reaches in the ACT have been altered by dams and weirs that change flow regimes and impact fish spawning movements. Water quality in the Murrumbidgee and Molonglo rivers has been adversely affected by upstream agricultural activities and urban run-off. Instream habitat (e.g., woody debris, rocky habitat) has been vastly reduced due to historical clearing of riparian areas and sedimentation (ACT Government, 2018).

Vegetation within the riparian zone is affected by changes to flow regimes, inundation, sedimentation and chemical properties. Riparian vegetation has a close association with instream ecology by supplying nutrients, filtering sediments, providing bank stability and providing instream habitat. The riparian zone also provides important specialised habitat required by some terrestrial and aquatic fauna, refugia during extreme events and corridors for movement of fauna through the landscape.

Reserve lands (including Namadgi National Park, nature reserves, special purpose reserves and water supply catchments) protect just over 72% of the ACT's aquatic and riparian areas. A further 16% of aquatic and riparian areas have specified LMA that aim to protect the ecological condition of aquatic and riparian areas on rural leases (ACT Government, 2018). The Murrumbidgee, Molonglo and the Queanbeyan rivers have their headwaters in NSW and rely on cross-border management of water resources and conservation.

Sections of river corridors in the ACT have protection under the Water Resources Act 2007, which helps protect water quality and aquatic habitat by minimising the impact of works. The Fisheries Act 2000 protects native fish populations from overfishing and protects spawning habitats in public waters (ACT Government, 2018). The Nature Conservation Act 2014 provides for broader protection and management of native plants and animals in the ACT, and the identification and management of protected and threatened species and ecological communities including Macquarie Perch (*Macquaria australasica*), Trout Cod (*Maccullochella macquariensis*), Two-spined Blackfish (*Gadopsis bispinosus*), Murray River Crayfish (*Euastacus armatus*), Silver Perch (*Bidyanus bidyanus*), Tuggeranong Lignum (*Muehlenbeckia tuggeranong*), Murrumbidgee Bossiaea (*Bossiaea grayi*) Murray Cod (*Maccullochella peelii*), Rieks Crayfish (*Euastacus rieki*) and Alpine Spiny Crayfish (*Euastacus crassus*) (ACT Government, 2018).

In addition, the ACT Aquatic and Riparian Conservation Strategy and associated action plans provide guidance on the conservation of aquatic and riparian areas and component species in the ACT. This includes managing threats; maintaining and improving ecological connectivity, ecosystem function and biodiversity; undertaking monitoring and research programs; and partnering with the community to support aquatic and riparian conservation (ACT Government, 2018).

Water security is a critical issue for both urban and rural landholders, relating to both the quality and quantity of the water resources. Managing water security within the Upper Murrumbidgee catchment is a shared responsibility held by both the ACT and NSW governments. The sharing of water resources is governed under respective ACT and NSW legislation, with cross-border collaboration promoted through the ACT–NSW Memorandum of Understanding on Regional Collaboration, the South-East and Tablelands Regional Plan and the ACT and Regional Catchment Strategy. The ACT and Region Catchment Coordination Group is established under the ACT Water Resources Act to strengthen coordination of water catchment management activities in the ACT and surrounding region. The Coordination Group includes representatives from ACT and NSW government agencies, local government, Icon Water and the community.

The Upper Murrumbidgee region is situated within the Murray–Darling Basin. The Australian Government's Murray–Darling Basin Plan, established under the Water Act 2007 (Cth), provides a framework for the management of water resources across jurisdictional boundaries in the national interest. The objectives of the Basin Plan are given effect through the ACT Water Resource Plan and the NSW Murrumbidgee Water Resource Plan.

Water use in the ACT is guided by the ACT Water Strategy 2014-2044 (ACT Government, 2014) which provides long-term (30-year) strategic guidance to manage the Territory's water resources. Given that the Territory is entirely within the Murrumbidgee catchment and wider Murray Darling Basin (MDB), the Water Strategy conforms to obligations under the MDB Plan (Murray-Darling Basin Authority, 2022). Under the MDB Plan, the Water Strategy notes that the ACT has a sustainable diversion limit (SDL) for surface water of 52.5 gigalitres (GL) per annum, with a further 3.16GL (or 3,160ML) per annum allocated for groundwater extraction.

Namadgi National Park provides up to 85% of Canberra's water from the Cotter Catchment in the ACT, with an estimated economic value of at least $100 million per year. A recent study of water filtration by permanent wetlands calculated they provide more than $7,000 worth of water purification per hectare each year. Conversely, the impacts can be significant where water quality is not protected by wetlands and other natural solutions.

Condition and trends

Ecological values used as indicators for the aquatic and riparian ecosystem include water flow and quality, stream channel geomorphology, native flora and fauna (including threatened species), riparian vegetation and riparian zone connectivity. Ecosystem stressors used as indicators for the aquatic and riparian ecosystem include inappropriate flow and fire regimes, invasive plants, introduced fish and terrestrial species, erosion and sedimentation. Management programs designed to reduce stressors (e.g. invasive plant and alien fish control and fire management) and enhancement programs designed to increase ecological values (e.g. revegetation, habitat replacement and catchment rehabilitation) are conducted throughout aquatic and riparian ecosystems (Malam, Brawata, McLean, Stevenson, & Seddon, 2021).

Trend in the condition over time is assessed where possible (i.e. improving, stable, declining, unknown) and confidence in the data used for indicator condition assessment is graded as either not available, low, moderate or high. In combination, condition assessment, trend and data confidence are used to assign a condition rating symbol to each indicator when considered against the reference condition and target condition (Malam, Brawata, McLean, Stevenson, & Seddon, 2021).

Categories: Good, Good with Concerns, Moderate, Poor or data not available.

TABLE X Condition Assessment Riparian and Aquatic Ecosystems (Malam, Brawata, McLean, Stevenson, & Seddon, 2021).

Ecosystem Component	Rating (against reference condition)	Rating (against targets)	Trends for Improvement	Comments
Water Quality	Moderate	Moderate	Steady	Sediment loads from urban and rural land use remains an issue
Stream Channel	Data unavailable	Data unavailable	Data unavailable	
Riparian Vegetation	Moderate	Moderate	Data unavailable	
Riparian Connectivity	Data unavailable	Data unavailable	Data unavailable	
Native Fish	Poor	Good	Improving	
Other Native Fauna	Data unavailable	Data unavailable	Data unavailable	
Impaired Flow	Poor	Moderate	Declining	Flow likely to decrease due to climate change
Inappropriate Fire Regimes	Poor	Moderate	Data unavailable	Fire regimes are too frequent in many areas.
Invasive Plants	Poor	Good	Steady	Control programs are proving effective.
Alien Fish	Poor	Good	Declining	Carp numbers are increasing which is of concern.
Invasive terrestrial species e.g., feral herbivores	Poor	Data unavailable	Data unavailable	More work is needed in this area.
Erosion and Sedimentation	Poor	Moderate	Steady	More monitoring is required to understand future trajectories.

In addition to the RIQUATIC CEMP, the very successful Waterwatch program measures water quality at 229 sites across the ACT. In 2020, 1,872 water quality surveys, 184 waterbug surveys and 219 riparian condition surveys were conducted by more than 200 volunteers. This important citizen science program results in the production of an annual Catchment Health Indicator Program (CHIP) report, which is a key output of the Waterwatch program. It provides a health score for our rivers and wetlands (O'Reilly, et al., 2021).

In 2020, the CHIP found:

- out of 98 reach report cards, 4 were in 'excellent' health, 36 were 'good', 55 presented as 'fair' and 3 received a 'poor' rating
- overall, 59% of reaches fell into the fair/poor range which is approximately the same as 2019 and a rise from 55% in 2018 which can likely be attributed to a mix of changes to the conditions, including the 2019/20 bushfires and the upper Murrumbidgee catchment receiving above annual average rainfall
- after the already extreme dry period in 2019, the driest year on record, all three main CHIP parameters adversely affected to varying degrees
- waterways in our upland reserves such as Gibralter Creek and the Cotter River were found to have the best health.

A greater number of Platypus were detected in 2020, with 31 individuals detected during Platypus Month (August) across eight river reaches. This number is higher than the 11 individuals spotted in 2019, however this observed increase may in part be attributed to three additional sites being added to the surveys in 2020 (O'Reilly, et al., 2021).

Pressures

- Inappropriate flow regimes
- Urban and rural runoff and pollution
- Changes in catchment hydrology and impervious surfaces
- Erosion and sedimentation
- Eutrophication
- Inappropriate fire regimes
- Invasive plants
- Alien fish species
- Poor upstream catchment management
- Terrestrial pest animals such as feral herbivores (e.g. deer)

Targets and actions

More information for specific targets and actions are outlined in the ACT Water Strategy 2014–44 (ACT Government, 2014), the ACT Aquatic and Riparian Conservation Strategy (ACT Government 2018), the Aquatic and Riparian Ecosystem Condition Assessment & Monitoring Plan (Malam, C et al 2021) and the Catchment Health Indicator Program (CHIP) Reports – Waterwatch (O'Reilly, et al., 2021)

Theme	Target	Actions
Water security	Long-term water security and efficient use of water particularly during drought.	Invest in water management (including storm water drainage) to ensure waterways are resilient to climate change. For example, water recycling and water sensitive urban design. The ACT to become a global leader in Water Sensitive Urban Design and water efficiency.
Riparian ecosystem health	Healthy riparian ecosystems.	Establish a strategic plan for restoration of riparian ecosystems (landscape-scale approach). Continue ongoing actions to improve waterways; and address the large gap in knowledge regarding the determination of success of interventions. Develop an overarching strategic plan for the restoration of riparian ecosystems that informs both on- and off-reserve management of riparian condition and connectivity. Increase investment in restoration of gully and riverbank erosion sites to reduce sediment entering the Murrumbidgee and Molonglo River systems. Prioritise revegetation and other on-ground improvement actions and evaluate to assess success and inform follow-up management action. Continue to reassess target conditions for habitats or species distributions and abundances over time.

Theme	Target	Actions
Aquatic habitats and ecosystems	Improved resilience of aquatic habitats and ecosystems.	Determine and deliver appropriate flow regimes, particularly around the use of flushing flows. Restore and protect flow for ecosystem resilience and function and key species recovery. Revitalise degraded urban drains into living streams that provide value as urban biodiversity corridors and contribute to the improved health and wellbeing of Canberra residents. Mitigate the impact of sedimentation from urban and rural catchment through catchment revegetation, adequate policy on urban development, bushfire management and supplementing instream habitat. Manage recovery from fire sediment run-off. Install functional fishways on priority structures (weirs and road crossings) that are obstructing fish migration in rivers and streams. Improve fish habitat and passage in sediment affected river reaches of the ACT. Deliver an education/behaviour change program aimed at reducing nutrient loads entering the waterways. Work with NSW Government to seek improvement in water quality in the upper reaches of the Molonglo River
Research and monitoring	Improved knowledge to enable effective management.	Monitor condition of ecosystems to better understand processes driving these changes and identify appropriate management actions to address negative impacts. Undertake research in a consistent, robust and standardised way to better assess ecosystem health across a range of temporal and spatial scales, and to inform evidence-based decision-making in an adaptive management framework. Collect, store and share environmental data (including spatial information) between relevant stakeholders effectively and efficiently. Undertake follow-up monitoring of management interventions to enable accurate assessment of management effectiveness and influences on program success. Further investigate the cost-effectiveness of different management interventions or strategies considering the management goals and objectives.
Collaboration	Engagement of community and research collaborations.	Continue to build and foster effective relationships and collaborations between land managers, environmental researchers, decision-makers, community organisations and citizen science programs both within the ACT and across border into NSW upstream and downstream of the ACT. Continue to support Waterwatch and Health Waterways Programs Greater recognition of the cultural values of waterways and the role of the Ngunnawal community

Bogs and Fens

Definition

Bogs and fens are wetlands that differ from each other in subtle ways. Bogs are mossy wetlands where almost all their water comes from rain and snow. Water in bogs is low in oxygen, very acidic and often cold. Sphagnum or peat moss is common, making bogs very spongy. Fens are more meadow-like; similar to bogs because they support deposits of peat, but unlike bogs because some of their water comes from small streams and groundwater. Fens have greater water exchange and are less acidic than bogs, so their soil and water are richer in nutrients (Natureworks, 2021).

Vision

Intact and functional wetland areas that filter water and provide habitat for important species over the short and long term and are valued by the community.

Asset

The High Country Bogs and Associated Fens Ecological Community is listed as an endangered community. Most bogs and fens in the ACT occur within Namadgi National Park. Bogs and fens are significant because they provide critical refuge and habitat for some endemic and threatened animal species, including the critically endangered Northern Corroboree Frog (*Pseudophryne pengilleyi*) as well as the Broad-toothed Rat (*Mastacomys fuscus mordicus*) and Alpine Tree Frog (*Litoria verreauxii alpina*), which are protected under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Bogs and fens also play an important role in protecting water quality within the ACT's water catchment.

The Ginini Flats Wetland Complex is the most significant intact Sphagnum Bog and Fen community in the Australian Alps and is listed under the Ramsar Convention on Wetlands.

Condition and trends

All bogs and fens in the ACT are protected and managed for optimum natural vegetation growth, water filtration and habitat. The bogs and fens in Namadgi National Park are of a very high quality, however, approximately 148 were affected by the 2020 bushfires leaving them potentially vulnerable to hydrological collapse due to post-fire erosion and channel incision, invasion by feral herbivores, weeds and sedimentation. Since the bushfire, the team at Namadgi, with assistance from Conservation Research, have begun a 5 year restoration program across a number of fire impacted high priority bog sites in the Bimberi Wilderness Area. This work will assist the natural recovery of these systems, by retaining soil moisture and protecting impacted sphagnum moss while it recovers naturally. An extensive monitoring program is also in place at these particular bog sites which will aid our understanding of how these systems respond to fire, and what management interventions provide the best assistance to promote a natural recovery.

Pressures

- Climate change and its associated impacts—the greatest threat to the bogs and fens in the long term, with potentially severe consequences.
- Fire—a major threat, with increased fire frequency related to climate change of particular concern as these communities are not well adapted to fire.
- Weed invasion.
- Deer and pigs—trampling of fragile ecosystems, creating wallows, ripping and grazing of critical vegetation.
- Feral horses—changes to feral horse policy in NSW combined with the increase in numbers and range of feral deer means the risk is increasing. The ACT Feral Horse Management Plan has been successful in quickly controlling the occasional horse incursions from Kosciuszko National Park; however, feral horses are considered a potential significant threat to the fragile bogs and fens ecological community if ACT control measures are insufficient to deal with increased incursions arising from changes to NSW legislation to protect wild horses.
- Recreation and tourism—of lower concern as many bogs and fens are difficult to access and are protected in Namadgi National Park.

Targets and actions

Theme	Target	Actions identified during stakeholder consultation
Protection of bogs and fens	Conserve high country bogs and fens in perpetuity as a viable and well-represented community across its natural geographic range in the ACT.	Protect all areas of bogs and fens in the ACT through reservation. Improve the condition and ecological function of bogs and fens. Enhance resilience to climate change by managing threats. Finalise an action plan for the ACT bogs and fens as per Section 101 of the Nature Conservation Act.
Managing threats	Manage threats to high country bogs and fens.	Implement programs to reduce hard-hooved animal impacts on bogs and fens e.g. Sambar Deer thermal imagery monitoring and control, pig programs etc. Control priority weeds. Control erosion that threatens the integrity of bogs and fens.
Research and monitoring	Improve understanding of bog and fen ecology.	Apply restoration principles and best-practice threat management, particularly considering climate change and monitor the outcomes of intervention. Continue to monitor important species such as the Broad-tooth Rat, Spiny Crayfish, Northern Corroborree Frog and Alpine Tree Frog.
Community collaboration	Strengthening stakeholder and community collaboration in the conservation of bogs and fens.	Raise awareness of the importance of bogs and fens. Engage volunteers in the rehabilitation of bogs and fens as appropriate.

Woodlands and Forests

Definition

Woodlands describes ecosystems that contain widely spaced trees with crowns that do not overlap. A forest is is dominated by trees having usually a single stem exceeding 2 metres in height and with existing or potential crown cover of overstorey strata about equal to or greater than 20 per cent. (ABARES 2018)

Vision

The people of the ACT working together to create healthy and diverse woodlands and forests for future generations.

Asset

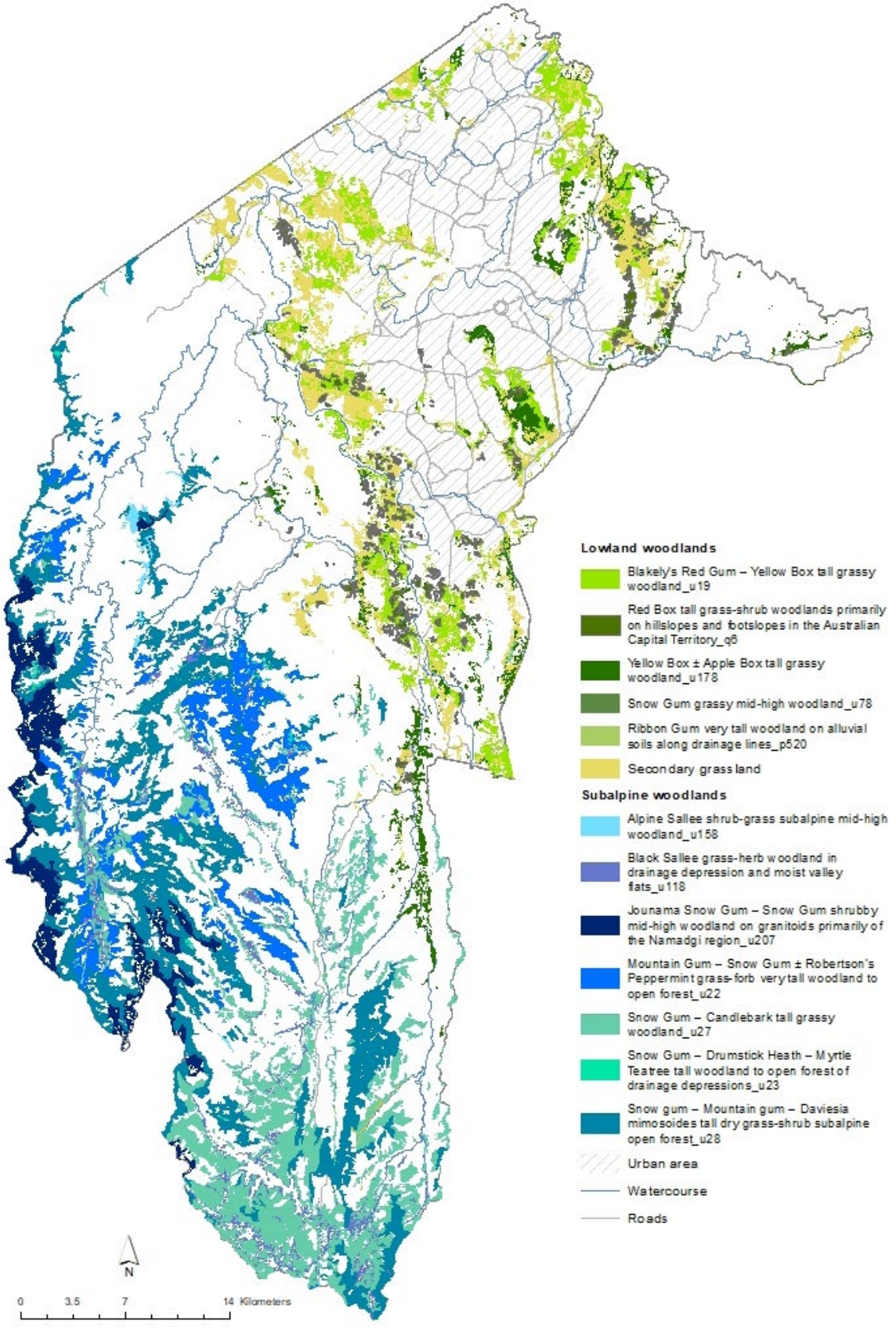
Native upland and lowland woodlands cover more than 79,000 ha in the ACT and have significant biodiversity, recreation and cultural values. Twelve woodland communities, including seven subalpine and five lowland systems, have been identified in the ACT. Subalpine woodlands occur between 730 m and 1910 m above sea level and cover approximately 48,409 ha of the ACT. Lowland woodlands occur between 440 m and 1340 m above sea level and cover approximately 13573 ha of the ACT (excluding secondary grasslands). Woodlands (including secondary grasslands) cover approximately 34% of the ACT's land area; lowland and subalpine woodlands cover approximately 13% and 21% respectively (ACT Government, 2018).

Our subalpine and lowland woodlands provide critical habitat for flora and fauna, including three plant species and nine bird species that are listed as threatened under the Nature Conservation Act:

- Canberra Spider Orchid (*Caladenia actensis*)
- Small Purple Pea (*Swainsona recta*)
- Tarengo Leek Orchid (Prasophyllum petilum)
- Superb Parrot (Polytelis swainsonii)
- Scarlet Robin (Petroica boodang)
- Brown Treecreeper (*Climacteris picumnus victoriae*)
- Hooded Robin (*Melanodryas cucullata cucullata*)
- Painted Honeyeater (*Grantiella picta*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Swift Parrot (*Lathamus discolor*)
- Varied Sittella (*Daphoenositta chrysoptera*)
- White-Winged Triller (*Lalage tricolor*)

For specific details, please refer to the ACT Woodlands Conservation Strategy (ACT Government, 2018) which includes action plans for the first five of the above-listed species. Conservation advice for the other species is available on the ACT Government's Environment website.

Figure 1 Distribution of woodland communities across the ACT



Condition and trends

Approximately 70% of the extent of all woodlands (including secondary grasslands) is protected within the ACT's formal reserve system. Most is subalpine woodland. Only 29% of the total extent of lowland woodland is protected in reserves; a further 44% persists on rural lands. The proportion of each lowland woodland community protected in reserves ranges from 23–100%. Lowland Snow Gum Grassy Woodland, Red Box Tall Grass–Shrub Woodland and secondary grasslands have the lowest representation in the reserve system (23%, 20% and 26% of extent respectively) (ACT Government, 2018).

Since 2004, an additional 1156 ha of woodland has been placed under protection in formal reserves, which is a significant improvement. This is in addition to a range of ACT Government policies that have been put in place to protect and enhance the values of woodlands outside the reserve system. However, lowland woodlands continue to be under threat from urbanisation, overgrazing, inappropriate fire regimes, invasive plants, pest animals, dieback and climate change (ACT Government, 2018).

Pressures

Native woodlands and their associated fauna across the ACT are subject to a range of impacts that threaten their condition, resilience and survival. Threatening processes include those that impact ecosystems at a regional scale (e.g. climate change) and those that are largely restricted to a single site (e.g. inappropriate grazing disturbance). The extent and severity of many threatening processes differ between lowland and subalpine woodlands. In many cases, threats interact. Wherever possible the potential impacts of these risks should be mitigated as part of a combined strategy to maintain and enhance the viability of woodlands in the ACT. The ACT Government has recently developed the Woodlands Conservation Effectiveness Monitoring Program although baseline knowledge gaps exist.

Urbanisation

New and existing urban development impacts connectivity and woodland habitat values across the ACT.The development and expansion of new suburbs will continue to be the primary cause of future losses of woodland habitat and ecological connectivity. The "Loss of mature native trees" and the "Unnatural fragmentation of habitats" have been identified as key threatening processes following advice the ACT Scientific Committee (2018,2019)

Overgrazing (macropods and livestock)

Macropods play a central role in grassy ecosystems. Under pre-European conditions (for example, likely natural predation by the Dingo and hunting by Aboriginal peoples), the woodland ecosystems were finely adapted to the shifting broad-scale grazing patterns and essential biomass control functions that the large macropods and their smaller relatives performed. Their densities across the ACT have increased considerably since the 1960s and they now exert high grazing pressure across some of the lowland reserves. This impacts the flora, fauna and soil composition at these sites. Livestock grazing, which can exert similar pressure on woodlands, poses a range of unique threats to woodland systems.

Changed fire regimes

Fire is a critical component of a functioning woodland. However, fire regimes that are changed from those that the vegetation communities evolved with can negatively impact ecosystem processes, plant communities and fauna habitat. The use by land managers of hazard reduction burns to aide in the protection of human life and property by addressing potential fire fuel is now standard practice. Climate change is causing a significant change in fire regimes due to dryer and hotter periods resulting in wildfires of unprecedented scale and intensity.

Fire regimes are characterised by the season, frequency and intensity of burning. Inappropriate fire regimes can negatively impact ecosystem processes, plant communities and fauna habitat (Driscoll, et al., 2010). Frequent fires can simplify woodland ecosystems by limiting regeneration opportunities, eliminating fire sensitive species and damaging groundlayer and other habitat features (e.g. tree hollows in subalpine woodlands (Salmona, Dean, & Banks, 2018).

The loss of mature trees can increase midstorey regeneration and fire fuel loads in lowland systems and decrease habitat availability and diversity in subalpine woodlands and forests (e.g. destroying tree hollows) (Salmona, Dean, & Banks, 2018).

Increasing frequency of large, high severity bushfires is likely to alter the extent and structure of a number of upland woodland and forest ecosystems. Short interval fires threaten the persistence of Alpine Ash stands in the ACT uplands where saplings are re-burnt before reaching maturity. The structure of Snow Gum woodlands has been affected by multiple bushfires over recent decades leading to a mallee like environment rather than one dominated by large, widely spaced hollow bearing trees characteristic of long unburnt subalpine woodlands. Such changes in vegetation communities and associate fauna assemblages are likely to continue in many areas as fire regimes shift under projected climate change.

Invasive plants

The spread and proliferation of invasive plants are threatening processes that can impact the ecological and cultural values of woodlands. In the ACT, invasive plants are more abundant, diverse and widespread in lowland woodlands than in subalpine woodlands. Invasive plants compete for resources (nutrients, water, sunlight) with native plants, thus putting native species at a disadvantage, which may particularly adversely affect threatened native flora. Invasive woody weeds, particularly the berry-bearing exotics such as Privet, Sweet Briar, Blackberry, Firethorn, Cotoneaster and Hawthorn have the effect of changing bird–fauna structures; berries are favoured by the aggressive Pied Currawongs, which have changed their movement and breeding patterns and are now seriously threatening populations of small passerine, which are favoured prey items for currawongs, particularly during the breeding season when passerines' nests are vulnerable to predation of their eggs and nestlings (NSW Government, 2021).

Pest animals

Pest animals, including European Rabbits, European Red Foxes, feral cats, feral pigs, feral horses, Indian Mynas, European Wasps, European Honeybees and several species of deer, can impact native species associated with woodland communities in the ACT.

Dieback

Dieback refers to the long-term decline in the health of trees, often leading to death. Dieback is becoming an increasing threat to trees and associated flora and fauna in woodlands in the ACT and more broadly across the wider region. Modelling indicates that recent changes in the condition of Blakely's Red Gum and the Box Gum Grassy Woodland community is influenced by a range of habitat and climatic variables. More recently, Snowgum dieback is appearing to become a major threat.

Climate change

Over the past 60 years Australia has experienced a shift in rainfall patterns and a warming climate. Future projections for the ACT include warmer temperatures, a reduction in cool-season rain, an increase in extreme drought events, and an increase in the number of severe fire danger days. These changes will alter the structure and floristic composition of woodlands in the ACT and likely compromise their function and resilience. Understanding these changes will help us develop realistic and achievable goals and to prioritise and implement strategies to maintain biodiversity.

Targets and actions

Theme	Target	Actions identified during stakeholder consultation
Protection and enhancement of woodland communities	No net loss of the ecological and cultural values of woodlands and to maintain or improve the proportion of each woodland community located within the ACT's formal reserve system.	Formally protect remaining lowland woodlands. This includes identifying opportunities to improve the representation of several woodland communities under formal protection. Improve habitat connectivity to facilitate the dispersal of plants and animals across the landscape. Maintain the extent, integrity and habitat features of vegetation communities, noting that plantings and other assisted natural regeneration activities are important for the restoration of sites with compromised ecosystem function. Manage herbage mass levels in recognition that native grasses and forbs play an essential role in maintaining the structure and function of grassy woodland systems. Maintain heterogeneous understorey structure and intermediate herbage mass. Collaborate with Australian Government land managers to assist with the application of conservation management across all lowland woodlands under its control to achieve the best level of protection
Improve resilience to climate change	Improve woodland resilience to climate change.	Promote climate-ready planting in rehabilitation programs so ecological communities are resilient to climate change. Incorporate carbon offsetting in planning. The ACT Climate Change Strategy has an overall goal of net zero emissions by 2045. Deliver control programs for pest animals and invasive plants.
Community collaboration	Engage the community in protecting and improving woodland communities.	Undertake meaningful collaboration between the ACT Government and stakeholders. Collaborate with rural landholders given that more than 40% of lowland woodland remains on rural land across the ACT. Enhance the participation of the Ngunnawal people in woodland management including cultural burning. Promote and facilitate community groups interested and active in woodland conservation in the ACT. Activities include advocacy, management, monitoring, restoration and raising public awareness. Enhance and promote citizen science. Support sustainable recreational use of woodlands. Communicate effectively with visitors and monitor and manage visitor impacts to maintain sustainable recreational use of our woodlands.
Monitoring and research	Undertake monitoring and research that supports natural ecosystems.	Monitor the condition of ecosystems to recognise change to better understand the processes driving these changes and identify appropriate management actions to address negative impacts. Collect baseline information to facilitate the adaptive management of woodlands by enabling managers to monitor changes from threatening processes and to track the impact of management interventions.

Grasslands

Definition

Native grasslands are vegetation communities that are naturally treeless, or have very few trees, and are dominated by native grass and a diversity of forb species. In the ACT region, those native grasslands that have not been substantially modified from their natural (or pre-European) state are Natural Temperate Grasslands. Natural Temperate Grasslands are dominated by native tussock-forming grasses such as Kangaroo Grass, Snow Grass, River Tussock, Wallaby Grasses and Speargrass, together with a range of native forbs including daisies, peas, orchids and lilies and often, in wetter sites, rushes and sedges. Grasslands that have lost most of their native forb species (usually through incompatible land use such as application of fertiliser or invasion by weeds) are in lower ecological condition and may no longer be classed as Natural Temperate Grassland. However, these grasslands are still classed as native grasslands if they are dominated by native grasses. Such grasslands may still be of high value for threatened and non-threatened fauna habitat, for connectivity between grasslands or between grasslands and woodlands, and for their use as buffers against areas of higher value (in Natural Temperate Grasslands of the South Eastern Highlands conservation advice). The native grasslands of the ACT provide important habitat for many plants and animals, including numerous critically endangered and threatened species.

Vision

Healthy native grasslands supporting a diverse flora and fauna for now and the future.

Asset

Natural Temperate Grasslands are considered one of the most threatened Australian ecosystems; they are listed in the ACT as endangered and listed nationally as critically endangered. The ACT contains significant remnants of the remaining extent of Natural Temperate Grassland in the region. As such, our native grasslands are a priority for protection and management.

Native grasslands provide habitat for a diversity of plant and animal species including the following threatened species:

- Grassland Earless Dragon (*Tympanocryptis lineata*)
- Golden Sun Moth (*Synemon Plana*)
- Striped Legless Lizard (*Delma impar*)
- Perunga Grasshopper (*Perunga ochracea*)
- Button Wrinklewort (*Rutidosis leptorrhynchoides*)
- Ginninderra Peppercress (*Lepidium ginninderrense*)
- Baeuerlen's Gentian (*Gentiana baeuerlenii*)

Native grasslands in good ecological condition support viable populations of grassland

species, are well connected in the landscape and are more resilient, including to climate change. The Grassy Ecosystems Management Kit outlines a step-by-step guide to developing conservation management plans for grasslands. Link

There are community groups in the ACT dedicated to the protection and management of Grasslands including Friends of Grasslands (FOG) and some Landcare groups.

Such assistance provides skills and resources not available within government outside the ACT Parks and Conservation Service. As an example, in 2020 FOG organised 37 work parties, involving 299 volunteers contributing 1,367 hours of their time. In total FOG contributed 9,748 volunteer hours, with a financial contribution valued at $487,500 (FOG Annual Report, 2020). www.fog.org.au Annual report 2020).

Other ParkCare and Landcare groups and NGOs in the ACT would have similar levels of dedicated delivery of NRM activities.

Condition and trends

Since European settlement our native grasslands have come under increasing pressure from agricultural modification, urbanisation, weeds and changing climate. Due to these changes, less than 10% of the grasslands in south-eastern Australia now remain in high ecological condition. Some species that are dependent on native grasslands have declined, along with their native grassland habitat. While many grasslands in the ACT are protected within conservation reserves, important areas remain unprotected on private and unleased Territory land.

Pressures

- Weed invasions
- Pest animals
- Inappropriate grazing by kangaroos and livestock
- Urbanisation
- Climate change
- Inappropriate planting of trees
- Changes to hydrology
- Inappropriate fire regime

Targets and actions

For specific details see the ACT native grassland conservation strategy and action plans for threatened species which guide the protection, management and restoration of native grasslands and its component species for the next 10 years (ACT Government, 2017).

Theme	Target	Actions identified during stakeholder consultation
Protect native grassland and component species	Conservation of all remaining areas of native grassland in the ACT that are in moderate to high ecological condition regardless of land tenure including urban open space and roadsides.	Negotiate voluntary conservation agreements with lessees in association with incentives and advice. Retain areas of native grassland in lower ecological condition that serve as ecological buffers or landscape linkages, or contribute significantly to threatened species conservation, or are a priority for rehabilitation. Conserve viable wild populations of native grassland flora and fauna species in the ACT. Better manage fragmented patches of off-reserve grasslands through community engagement. Support local, regional and national efforts towards conservation of these species. Collaborate with Australian Government land managers to assist with the application of conservation management across all ACT land to achieve the best level of protection achievable. Develop a strategy and plan to restore vegetation across the landscape, within the city, rural roads, schools and grounds of other institutions to link to existing nodes and create continuous vegetation corridors. Apply adaptive management principles through the facilitation of research and implementation of monitoring to continue to increase knowledge bases and achieve better outcomes. Apply grassland conservation principles for management of grasslands on unleased Territory land and negotiate conservation agreements and covenants with lessees to ensure protection to grasslands in currently unprotected urban and rural areas. Agreements should enable funding opportunities, advice and assistance.

Theme	Target	Actions identified during stakeholder consultation
Reduce threats to native grassland biodiversity	Threats to grassland biodiversity, regardless of tenure, are prioritised and addressed.	Prevent or manage the impacts of threatening processes to maintain or improve the ecological condition and biodiversity of native grasslands, with particular attention to threatened species. Deliver control programs for pest animals and invasive plants.
Enhance resilience, ecosystem function and habitat connectivity	Enhanced ecosystem function of grassland areas to improve resilience.	Develop a revegetation plan that includes the identification of sites, the supply of seed for up to 200 native grass and wildflower species, and an associated major seed orchard to underpin these works. Include development of specialist skills and appropriate equipment. Enhance habitat and plant species diversity within existing remnants, applying best practice management (frequency, methods and intensity of herbage mass manipulation, pest plant and animal control). Re-introduce additional species into existing remnants (ecologically and habitat-appropriate planting and fauna habitat enhancement). Create new habitat to provide a more natural landscape that links remnants and provides opportunities for the public to appreciate elements of the natural landscape.
Monitoring and research	Improved understanding of ecological condition.	Monitor changes in the condition of ecological communities and their biodiversity, a key part of effective protection and long-term management of species and ecological communities.
Community collaboration	Work collaboratively with community to conserve native grassland areas	Increase recognition of the link between nature and the Ngunnawal people and the adoption of traditional land management practices. Provide NRM volunteers with opportunities for improving their skills, sharing knowledge and experiences, and passing on information gained. Develop and implement site management plans to ensure actions are coordinated with all stakeholders and undertaken in the most effective way. Provide opportunities in grant applications to include funding specialist advice to guide planning and help achieve successful outcomes.

Ecosystem function and services

Ecosystem function and services

Definition

Ecosystem function describes the natural processes and services provided by the environment that help sustain life. These include:

- filtering and cleaning of air, water and soil
- providing natural storage and cycling of nutrients, carbon and water that sustain life
- creating habitat and ecosystem niches
- cooling and shading urban and rural areas
- providing fertile soils and water for agriculture
- pollination of plants to maintain biodiversity and ensure ecosystem health and food security.

Vision

The environment continues to provide critical ecosystem functions and services that ensure a high quality of life and support healthy natural systems.

Asset

The ACT is fortunate to have nature on our doorstep with numerous trees and other vegetation providing a range of ecosystem services. The ACT Urban Forest Strategy 2021–2045 (ACT Government, 2021) identifies street trees, ovals, wetlands, creeks, nature reserves, parks, private yards, green roofs and balconies, and living walls as the 'living infrastructure' within the urban landscape. This living infrastructure provides a range of vital services including:

- provision of shade and cooling our cities to mitigate the urban heat island effect
- reduction of stormwater flows and reduced nutrient loads given the tree canopy intercepts heavy rainfall and tree roots reduce nitrogen, phosphorus and heavy metals in run-off
- nutrient cycling
- production of oxygen
- cleaning the air through removing carbon dioxide, nitrous oxides, sulphur dioxide, carbon monoxide and ground level ozone from the atmosphere
- provision of habitat and connectivity, enhancing biodiversity and wildlife movement across the landscape
- storage and sequestration of carbon.

Another critical ecosystem service that has been overlooked previously is the pollination of plants to ensure healthy ecosystems and food security. Pollination is the transfer of pollen between plants which results in the transfer of genetic information and reproduction and production of seeds. Pollen can be dispersed by wind, water and animals such as bees, bats and birds with the majority from insects (Australian Museum, 2018). Native bees and other pollinators may be adversely impacted by domestic and feral European Honeybees, thus impacts to pollination of native flora may be affected.

Condition and trends

In the face of climate change, Canberra will have increasing problems with urban heat and flash flooding unless action is taken to increase tree canopy cover and surface permeability. In order to drought-proof the city, we need: more canopy cover and permeable surfaces to capture and use rain; to increase waterway naturalisation; and to retrofit existing infrastructure to divert, harvest, store and use stormwater. The ACT is currently progressing these initiatives through its Healthy Waterways program but more needs to be done.

High levels of permeability reduce flash flooding, rehydrate the ground (improving vegetation health) and mitigate the pressure on engineered stormwater infrastructure. Vegetation holds rainwater in its foliage and its roots, retaining water in the soil. Slowing water flow through open spaces and wetlands will reduce risks from flash flooding from intense storms as well as improve water quality. As our city expands and becomes more densely developed, existing land and water corridors need to be supplemented. This will also promote healthy soils, which have a greater capacity to store water, filter pollutants and recycle nutrients.

Living infrastructure expenditure is an investment; there needs to be a greater focus on the provision of this. Accounting for and valuing this investment will help inform ACT Government decisions in future. It will also provide increased certainty for growth, innovation and development of economic sectors that rely on natural outdoor spaces, such as tourism, recreation, research and education.

The urban forest that exists today needs to be protected and expanded. There is currently no overarching legislative framework to protect and replace trees when they are lost. There are some protections for exceptional trees and those with high biodiversity and eco-cultural values. Growing a resilient forest recognises the need to grow our tree canopy cover while ensuring that our urban forest is resilient. To grow the urban forest, we must invest in sustainable end-of-life removal and replacement programs and in new plantings across our urban areas.

Pressures

Climate change and resilience

Climate change is already apparent in the Canberra region. Higher temperatures and longer and more frequent droughts and heatwaves are becoming more common. This is increasing the urban heat island effect. This effect was more pronounced in areas with a lower tree canopy cover (ACT Government, 2021). Urban trees provide shade throughout the day which prevents the built environment from heating to extreme levels.

Climate change is having an increasing impact on ecosystem function and processes. The 2017–20 extended period of dry weather conditions followed by smoke haze, bushfires and flooding rain in the ACT is an example of the increasing severity, intensity and compounding of challenges. Climate change is amplifying heatwave frequency, intensity and duration.

Urban heat island effect

The urban heat island effect is created by the built environment when pavements, roads and buildings absorb the sun's heat and radiate it back causing an increase in temperature during the day and preventing night-time cooling. The 2017 Mapping Surface Urban Heat in Canberra (CSIRO, 2017) showed that the highest urban heat in Canberra is found at town and group centres, industrial suburbs and newly developed areas (greenfield estates). In built-up areas, the surface urban heat island at night was around 8°C warmer in summer than in surrounding rural areas.

Heatwaves

Heatwaves disproportionately affect the most vulnerable Canberrans, including children and the elderly, and those living in apartments and at the urban fringe. Warmer city temperatures also lead to higher energy use and household costs. Hot weather reduces the opportunities for people to be active outdoors, including recreation and work. A person's standard of living and health may affect their ability to prepare for and cope with extreme weather events such as bushfires or heatwaves.

Air quality

On average, Canberra faced 16 days of poor to hazardous air quality per year (2012–18). The average monthly Ambient Air Quality in Canberra has improved during COVID-19 compared with preceding years (2012–19) except for particulate matter.

Canberra faced poor to hazardous air quality during bushfire events, where it dropped to around 91% during 2019–20 compared with 99% (very good to fair) during the years 2012–18.

Urban forest

As the climate changes the importance of the role of trees in making our city more liveable for the community becomes increasingly important. It will become more challenging to establish young trees in a hotter and drier climate and ongoing management of mature trees will be critical as we adapt to more frequent and intense heatwaves and thunderstorms. The appropriate selection of tree species in fire management zones will continue to be an important consideration. In 2015 the tree canopy cover for Canberra was 19%. The Living Infrastructure Plan sets a target of 30% by 2045 (ACT Government, 2021).

Water Permeability

Impervious surfaces, such as infrastructure and compacted soils, result in a much higher rate of water run-off than natural catchments, which hold water in vegetation and soils. This increases the impacts of drought, reduces biodiversity, increases the urban heat island effect and increases the impacts of flooding, causing erosion and other damage. The increasing urban densification of Canberra, with higher densities in newer suburbs, infill and renewal projects, is increasing the impermeable surfaces in the city. A recent study shows some new areas have 13% less nature strip permeability and soil than older suburbs (ACT Government, 2021).

Natural systems filter stormwater to reduce urban pollutants entering the waterways. Blue-green algae, caused by a build-up of nutrients, is a regular summer occurrence at some lakes around Canberra, posing a considerable hazard to human and animal health and causing regular lake closures. In 2018, lakes and swimming areas were closed on 43 days (ACT Government, 2021). Natural and created wetlands and good vegetation cover in catchment areas helps to filter nutrients to reduce the likelihood of this occurring. They also filter other hazardous pollutants such as detergents, organic matter and heavy metals.

Pollinators

The main threats facing native pollinators are habitat loss, degradation and fragmentation aa well as competition from feral and domestic European Honeybees. As native vegetation is replaced by roadways, manicured lawns, crops and non-native gardens, pollinators lose the food and nesting sites that are necessary for their survival (US Fish and Wildlife Service, 2021).

The improper use of pesticides can negatively impact pollinators and their habitats. Pesticides are used in nearly every home, business and school; they are found almost everywhere in our environment. By their very nature, most pesticides pose some risk of harm to humans, animals or the environment because they are designed to kill or adversely affect living organisms. Bees are affected, particularly by foliar spray (US Environmental Protection Authority, 2014).

Targets and actions

Theme	Target	Actions identified during stakeholder consultation
Urban forests, urban biodiversity and living infrastructure	Achieve 30% tree canopy cover by 2045 or a tree canopy equivalent (such as green roofs, shrub beds, wetlands and rain gardens etc). in line with Canberra's Living Infrastructure Plan: Cooling the City	Explore the concept of 'rewilding' Canberra and look at innovative ways of integrating people and nature including naturalising waterways, reintroducing wildlife into suburbia, water sensitive urban design, living infrastructure, converting bitumen to native grasses etc. Complete inventory and mapping of living infrastructure (including mature and senescent trees) and expand the public urban infrastructure asset management system to include living infrastructure. Implement registration and lifecycle accounting for living infrastructure for effective and sustainable management. Implement strategic planting to support wildlife and to reduce the risks from the key climate change impacts. Identify and protect culturally significant trees and raise awareness of their importance, particularly those involved in development and tree removal activities. Develop a sustainable and ecologically informed planting program to increase canopy cover equitably across the urban footprint. Consider introducing a canopy contribution framework for trees on both public and private land so, when trees must be removed and cannot be replaced, they are replaced elsewhere. Ensure trees that have been removed in the urban environment are replaced with one or more new trees. Plant species that are suitable for a changing climate. Develop infrastructure to support the urban forest and liveability—the urban forest cannot be managed in isolation of other living and hard infrastructure. Partner with the community to grow and maintain the urban forest. Include volunteer programs, incentives to keep trees on private land, and inform the broader community how to value, care for and protect the urban forest. Review and update the Tree Protection Act and Public Unleased Land Act to ensure appropriate compliance mechanisms exist to deter illegal tree removal or damage to trees on leased and unleased land and respond appropriately when they occur. Review and update the Public Unleased Land Act to require all developers to erect prescribed fencing to protect existing trees on public land from damage prior to demolition, excavation and/or construction on adjacent blocks. Develop an urban wood reuse plan for trees removed from public land. Ensure by-product from maintenance of the urban forest is used to support tree health and biodiversity conservation including in habitat restoration programs and nature-based park features.

Theme	Target	Actions identified during stakeholder consultation
Water Sensitive Urban Design	30% permeable surfaces in Canberra's urban footprint by 2045. – in line with Canberra's Living Infrastructure Plan: Cooling the City	Retain water in the landscape through revegetation and capture of rainfall. Continue to invest in the Healthy Waterways program. Support trials and demonstration projects to retrofit infrastructure to allow hydration of open spaces using stormwater. Incorporate water sensitive urban design into public and private development as part of effective integrated urban planning. Where appropriate, install and maintain rain gardens and swales for urban water run-off in tree and understorey planting areas, in urban streetscape upgrades and new estate developments. Review municipal design standards to include specifications on urban rain gardens and/or urban stormwater swales as planting locations on verges and other locations.
Ecosystem services	Integrate ecosystem services into planning.	Implement programs to recognise that living infrastructure assets are an essential part of our economic prosperity and provide wide-ranging and vital benefits and revenue. Protect pollinator habitat and biodiversity to protect populations of pollinator species that contribute to the health of the wider environment.
Quality of life	Improve liveability for Canberra residents through nature.	Promote community-wide health and wellbeing through access to nature which provides recreational, fitness and relaxation opportunities, and improves mental health. Provide increased access to shade. Improve access to and amenity of nature in the city.
Community collaboration	Community collaborates to ensure healthy ecosystem function	Partner with the community to grow and maintain the urban forest. Include volunteer programs, incentives to keep trees on private land, and inform the broader community how to value, care for and protect the urban forest.

Governance

Governance

Definition

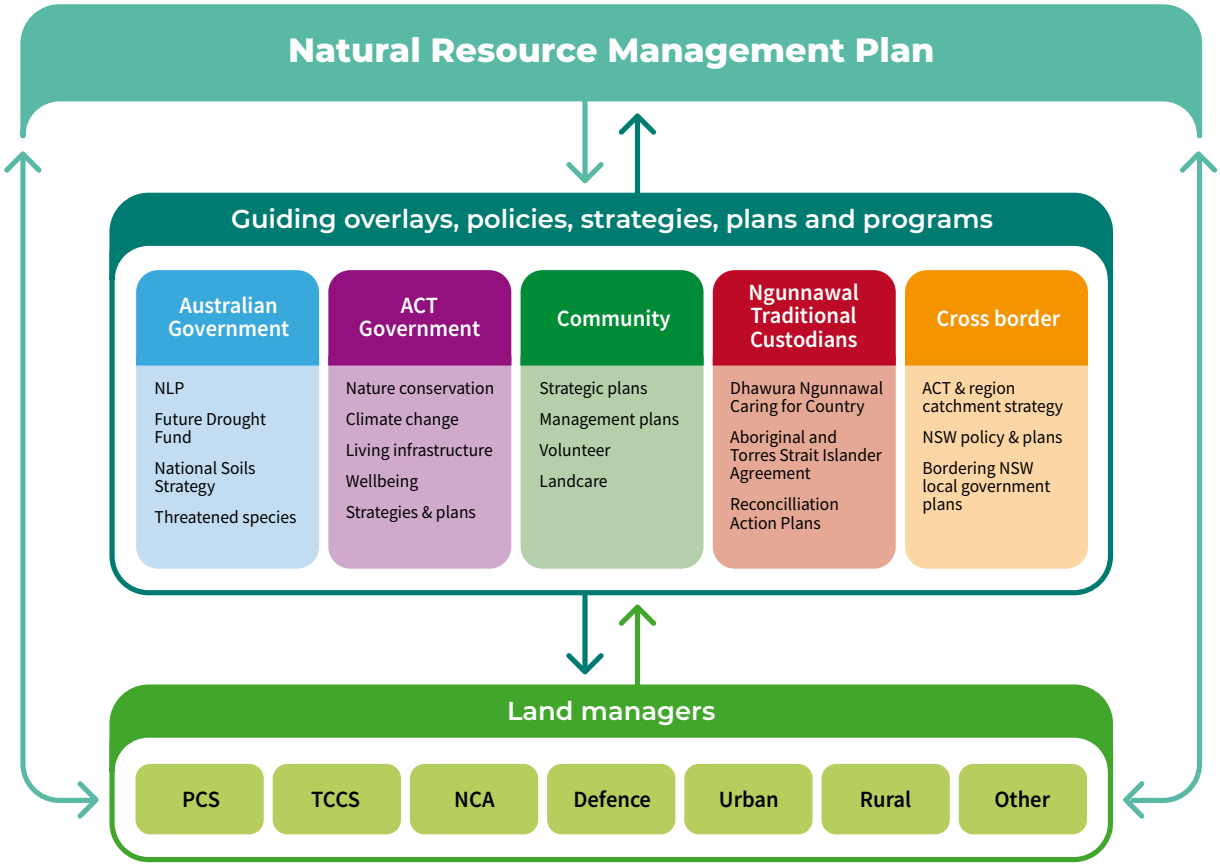
Governance encompasses the systems and processes by which organisations or sectors are managed and operate, as well as accountability mechanisms. In the natural resources sector in the ACT, governance-related themes include ensuring community priorities are reflected in the design and implementation of the plan, improving collaboration and integration within ACT Government, developing structures of accountability, strong leadership, implementation, regulation, resourcing, communication and monitoring and evaluation.

Vision

Multi-jurisdictional departments and community working together to achieve sustainable management of resources and aligned decision making processes.

Asset

FIGURE 2 NRM plan



Condition and trends

A lack of communication and integration between different functions of government was recognised strongly in the 2009 Bush Capital Legacy—Plan for Managing the Natural Resources of the ACT and continues to remain an issue. The silo approach of different directorates is a strong theme that emerged through internal and external consultation workshops.

Far greater integration and coordination between community and government, within government and across tenure and jurisdictions is necessary for the plan to succeed. It was highlighted that the ACT NRM team could play a key role as an integrating and connecting body.

The contributions and achievements of the landcare community for taking ownership and improving the natural environment are significant and this needs to be better recognised and integrated into planning and management policies.

Pressures

A lack of integration between government directorates has resulted in opposing activities; for example, urban development and protection of important ecosystems such as Box Gum Woodlands and Native Temperate Grasslands. Similarly, developments and events occurring in neighbouring parts of NSW have the potential to significantly influence the ACT's environment and vice versa. It is important that cross-directorate and cross-border land management issues and initiatives are managed in a collaborative way.

Better compliance regulation of environmental laws is also required (in association with education) to ensure the important laws and regulations designed to protect the environment are complied with and enforced appropriately.

There is a need for improvements to governance systems to improve accountability, ensure community priorities are being reflected in government activities and ensure strong collaboration with the community.

Targets and actions

Theme	Target	Actions identified during stakeholder consultation
Governance framework and compliance	Improved NRM governance and accountability.	Review the ACT's governance framework for NRM to improve clarity and transparency in decision making. Establish an independent NRM advisory group to advise on the activities of ACT NRM and the implementation of this Plan and associated programs.
Science-based decision making	Decisions utilise the best available science.	Ensure robust science, evidence and evaluation underpins NRM decision making and guides the adaptive management of Country. In the face of climate uncertainty, make decisions on the best available evidence.
Data management	Improve NRM data management and accessibility.	All activities and decisions consider monitoring the effectiveness and logistics of data capture, processing, and storage (including considerations to supplying standardised monitoring methods and data collection tools where applicable). Build a robust NRM database of activities and decisions to underpin governance. Include science-related projects in the EPSDD Environment Research Directory, which aims to foster discoverability, enable consultation and discussion, build linkages, share knowledge, and research outcomes. Enhance community access to government environmental data.
Community involvement	Greater participation of community in decision making relating to NRM.	Establish a regular meeting between peak NRM-based community groups and senior decision makers to exchange information on key environmental and rural issues. Develop a program of reward and recognition of community contributions to NRM.
Agency integration	Improved integration and cross-sector collaboration on NRM across government.	Put processes in place to ensure different government directorates are communicating with each other effectively regarding the management of the ACT's natural resources; in particular, between the Environment Division of EPSDD and TCCS and for internal communication between divisions within EPSDD. Enhance agency integration for the management of public places where there are opportunities to get better environmental outcomes by coordinating biodiversity conservation, volunteer, and operations activities. Better integrate compliance and environmental stewardship activities.
Cross Border Liaison	Establish cross-border NRM liaison with the NSW Government.	Form a government cross-border NRM liaison group between the NSW and ACT governments.
Improved compliance with environmental regulations	Stronger environmental regulators.	Provide greater emphasis on and support for environmental regulation to ensure the important laws and regulations designed to protect the environment are complied with.

How are we going to achieve our vision?

How are we going to achieve our vision?

The NRM Plan is a non-statutory, aspirational document that creates a shared set of visions, targets, and actions that community and government can come together to work towards. The ACT already has an impressive suite of strategies that are being delivered in numerous and varied ways by many different groups who, together, are realising many great achievements, particularly in the conservation of the natural environment, rural lands, water, and sustainable living. However, there are areas that require improvement, particularly in the areas of traditional land management partnerships with the Ngunnawal community, inconsistencies in government policies (particularly in relation to urban development) and cross-directorate collaboration.

The Plan promotes the adoption of a collaborative land stewardship approach that incorporates the perspectives of different stakeholders—including the Ngunnawal community, non-government organisations, community members and scientists—and which underpins management and action to sustain the long-term health of our environment.

FIGURE 3 Network diagram

Implementation of the Plan is the responsibility of all areas of the ACT Government as well as the community. ACT NRM can partner with the community, industry, and agencies to provide some guidance.

The Plan will be formally reviewed and, where required, updated every five years; however, ongoing engagement through regular forums will ensure the community continues to be empowered to update priorities and take action to deliver on specific targets within an adaptive management framework.

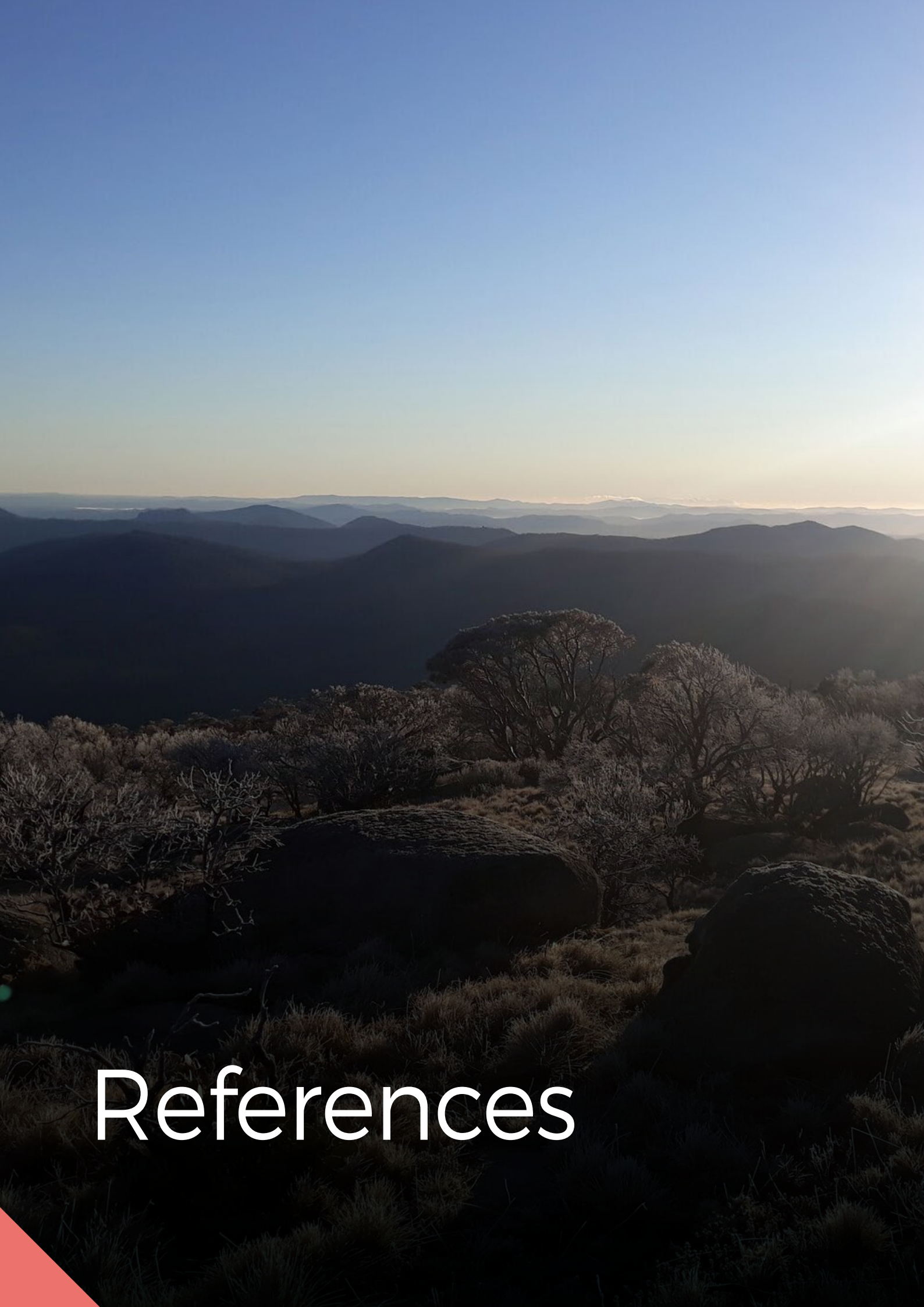
Success of the Plan will be the sum of all its parts. Investment in different aspects of the Plan will be obtained through ongoing programs and specific initiatives in each target theme. This will be underpinned by Australian Government investment through the National Landcare Program and other Commonwealth grants, ACT Government funding programs, business commitments towards sustainable management and the continued in-kind support of community volunteers. It will require investment in initiatives that promote the alignment of policy priorities so different areas of government are collaborating and working towards the priorities outlined in this Plan. The combined outcomes will determine progress in moving towards our overall vision for the Canberra region.

Measuring the success of the NRM Plan will combine the broader outcomes of the range of detailed strategies, targets and actions associated with each theme at the strategic level. Key focus areas to determine overall success of the delivery of the Plan include:

- outcomes of on-ground action (enhancement works and threat management) underpinned by research and citizen science in determining success of intervention activities for each theme. This includes prevention of continued fragmentation and decline of important vegetation communities such as Box Gum Woodlands, Native Temperate Grasslands and riparian areas (including the management of threats such as development, weeds, pests, climate change and fire regimes), improved management of urban open space and protection of ecosystem services
- the level of ongoing involvement of community groups and individuals and their achievements, and the level of support provided by the ACT Government and catchment groups
- progress towards Ngunnawal community involvement in land management and the integration of traditional knowledge into the management of natural resources
- improvements in sustainable agriculture practice and recognition and support for the natural asset stewardship undertaken by rural landholders
- the continued expansion of areas of conservation through ACT reserves and rural conservation areas, including the level of protection offered to important urban open spaces and mature trees
- the level of awareness of the broader community about the important role that a healthy environment plays in our overall health and wellbeing
- levels of investment in research to underpin improved NRM planning and innovative opportunities
- changes to the impacts of the expanding urban footprint and the better incorporation of climate change and biodiversity management into land use planning such as the incorporation of 'rewilding' Canberra through green infrastructure in new developments and existing urban areas
- the success of integration of management between government departments
- progress towards investigating the development of carbon and biodiversity trading.

In addition, the ACT also has an impressive array of information on the condition of the natural resources. This information is brought together and analysed through the regular State of the Environment reporting and the Conservation Effectiveness Monitoring Program. This is an important process and resulting information will be instrumental in tracking progress towards targets.

The success of the implementation of the Plan will depend on all of us working together towards common goals. Whether community or government, we all play an important role moving towards a sustainably managed Canberra where our environment, which we all rely on for our clean water, clean air and general wellbeing, is recognised as the highest priority.



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Appendices

Appendix 1

Review of NRM achievements since 2009

The previous ACT NRM Plan the Bush Capital Legacy (ACT Natural Resources Management Council, 2009) set a range of targets. These targets have been reviewed with the progress towards the target ranked good progress (green), some progress (orange), and poor progress (red).

Targets	Achievements since 2009
Ecological Footprint	While there has been a 24% decrease in Canberra's ecological footprint per capita since 2004, the ecological footprint is still nine times the size of the ACT. Further progress needs to be made. The ACT footprint is dominated by impacts from the land disturbance for animal-based food production, although this has decreased by 23% since 2004. However, in per capita terms, land disturbance from the impacts of food expenditure accounted for 50% of the ACT's total ecological footprint in 2017–18. The ACT's carbon footprint is now 11% lower than that of Australia. Expenditure on mobility accounted for 25% of the total carbon footprint in 2017–18 compared to 19% in 2003–04. Transport is the highest contributor to the ACT's carbon footprint.
Indigenous Engagement	Work is still required to realise the targets of the 2009 NRM Plan. A Reconciliation Action Plan for EPSDD was launched in 2019; however, work is required to achieve co-management of conservation areas and incorporation of traditional knowledge in NRM. Progress has been made through specific programs such as the Murumbung Yurung Murra Network, the Southeast Australia Aboriginal Fire Forum, the Rock Art Working Group/Elders, ACT Place Names and programs in other ACT Government agencies such as Health and Corrections. The Dharuwa Ngunnawal Committee has been set up within EPSDD. An NRM Indigenous facilitator position, associated with funding linked to the NRM Plan, runs Indigenous engagement programs.
Community Capacity	Community capacity in the ACT is high, with people volunteering in programs facilitated by the three catchment groups, Landcare ACT, multiple environmental and community special interest groups, non-government organisations, the ACT Government ParkCare volunteer program (including development of the ParkCare database), TCCS Urban Landcare, and citizen science programs such as Waterwatch and Frogwatch.
Community Participation	The ACT has the highest volunteering rate nationally, with 36.8% of the population actively volunteering. These volunteers contribute more than $1.5 billion to the ACT economy every year. Although volunteering is high in the ACT in broad terms, there is still a need to increase the general public's knowledge and awareness of environmental issues.

Targets	Achievements since 2009
Integration of Planning Frameworks	This area needs more work and remains an ongoing challenge. This has been highlighted as a priority through both internal and external stakeholder workshops. For example, better integration between government agencies managing urban, rural and conservation areas.
Urban Land Health	Urban land expanded by 57% between 1991 and 2016, with a further 46% increase by 2041 predicted (100,000 new dwellings). The target for urban development is for 70% of new buildings to be infill in existing urban areas (currently at 58%). If this infill target is met, there will be a 16% increase in the urban footprint by 2041. Land development is a major environmental challenge, with a general lack of information about land health in the ACT, both for long-term changes and current conditions. This lack does not enable an assessment of land and soil health and remains a critical gap in understanding of environmental condition.
Rural Land Health	Drought impacted rural landscapes in recent years, significantly reducing groundcover. Drought was followed by a wet spring in 2020 that led to increased weed invasion and erosion. On-ground works and training programs help landholders address key threats such as erosion, weeds, and loss of native vegetation, however many properties are still not involved. Land Management Agreements provide land management advice but do not have specific targets. Soil and land capability assessments still need to be undertaken and soil carbon is yet to be addressed. Most of the threatened Box–Gum woodlands occur on rural land and their long-term management is still not being addressed effectively at the landscape scale.
Water Supply Catchments	The ACT Water Strategy identified targets to improve water supply catchments. The 2018 'report card' showed very good progress, with 27 of the 31 actions in the initial implementation plan completed including: » establishment of the ACT and Region Catchment Management Coordination Group » commencement of the ACT and Australian government funded ACT Healthy Waterways Project » in-principal agreement to water trading with NSW » delivery of the regional H2OK stormwater education and behaviour change program » continued delivery of the Upper Murrumbidgee Waterwatch Program. Activities in Implementation Plan 2 include coordinated community engagement in non-government managed landscapes. The Cotter Catchment was a focus after the 2003 bushfires, and in the 2009 NRM Plan, with significant work undertaken through the Lower Cotter Catchment Strategy. However, pressure on the Southern ACT Catchment areas due to the 2020 fires needs to be addressed.
Water Use	Permanent water conservation measures are in place in the ACT. Total consumption of residential and non-residential water reduced in response to the Millennium Drought and behaviours have been relatively consistent since then, (Average consumption has fallen due to a combination of changes in water behaviour, water pricing and more efficient water fixtures and technologies.

Targets	Achievements since 2009
Surface Water Quality	In the past three years, the ChiP report found that around 60% of the 98 monitored sites received a fair/poor rating and 40% good or excellent. Changes were due to drought and bushfires, followed by above average rainfall. Nearly all lakes and river sites experienced closures due to Enterococci, including Lake Ginninderra. Lake Tuggeranong and Lake Burley Griffin were closed for blue-green algae, with Lake Tuggeranong closed for most of the recreational season. Despite progress on improving water quality, more work is needed to address the high number of reaches receiving a fair or poor rating. Drinking water quality is high due to a mixture of protected catchments and water treatment by ICON. Bushfire in 2003 and 2020 impacted on water storages.
Riverine Ecosystems and Wetlands	Progress has been made against this target, particularly in urban areas, however more needs to be done in rural areas. The health of our riverine ecosystems is variable depending on their location. Riparian areas affected by the 2003 bushfires are recovering. Areas affected by the 2020 fires are highly impacted, particularly the bogs and fens in southern Namadgi National Park. All ACT-listed aquatic species have around 90% to 100% of their potential distribution in conservation areas, however many of these areas have been impacted by fire in 2020 (burnt habitat or mobilisation of sediment). Rural landscapes, particularly burnt areas, continue to be impacted. The Healthy Waterways project and community Catchment Group action are targeting improving urban water quality however long-term outcomes are yet to be realised. Preliminary research has indicated that installation of wetlands has been effective in reducing nutrients moving downstream. The ACT has the Ramsar-listed Ginini Flats Wetland Complex in the Namadgi National Park and 12 nationally important wetlands listed in the Directory of Important Wetlands in Australia. High Country Bogs and Associated Fens was added to the endangered category of the ACT Threatened Ecological Communities List in February 2019. Native fish comprise less than 30% fish abundance and 20% of biomass in the Murrumbidgee River. There were population increases for Macquarie Perch, Two-spined Blackfish and Murray Cod in 2019 (pre fire). However, Trout Cod numbers declined. Since the 2020 fires, Two-spined Blackfish populations declined due to sediment and fires. Platypus numbers rose significantly in the 2020 surveys. 270,000 native fish were stocked to lakes and ponds from 2015 to 2019.
Environmental Flows	Within the ACT environmental flows are progressing in a positive direction. Murrumbidgee River flows are greater downstream of ACT. Environmental flow targets were met downstream of reservoirs. There are significant challenges regarding environmental flows entering the ACT from NSW. The flows entering the ACT may not be adequate to maintain ecological function. The delivery of environmental flows to the river comes from Tantangara Dam which diverts 96% of the headwaters as part of the Snowy Hydro Scheme. The flows in the upper Murrumbidgee are well below the scientifically accepted level 80th percentile flows required to maintain a healthy river ecosystem. The ACT does not have control over water entering the ACT from NSW and better cross-border integration in management has been identified as important.

Targets	Achievements since 2009
Groundwater	Groundwater is a minor component of total water use in the ACT, and typically restricted to non-potable supply. A lack of comprehensive data on groundwater resources and quality data in the ACT makes it difficult to assess their condition. The ACT's State of the Environment 2015 report concluded that groundwater availability and quality were likely to be good in the ACT. It was also concluded that the volume of groundwater extraction was far less than the recharge volume for aquifers.
Communities and Habitat	Some progress has been made towards this target. Work is still required, particularly with regards to monitoring and assessment at scale. By 2019 141,000 hectares have conservation status in the ACT, protecting 60% of the total ACT area. And a further 1865 ha as Environmental Offsets (47%) are in nature reserves. The State of the Environment rating in 2019 for the extent of native vegetation was good, however it stated it was not possible to determine the condition of conservation areas in the ACT or changes over the reporting period (2015–16 to 2018–19). Available condition assessments show an increased occurrence of dieback, large areas of poor riparian connectivity, much vegetation outside tolerable fire intervals and vegetation dominated by early and young growth stages. Only 34% of native vegetation is within optimal tolerable fire intervals – 90% of burning in the ACT is for hazard reduction rather than for ecological or cultural reasons. However, woodlands, Natural Temperate Grasslands and secondary grasslands have shown an increase in native plant species richness, suggesting an improvement in condition. It was also not possible to assess whether offsets have ensured no net loss of biodiversity as a result of land development. While the loss of native vegetation due to urban development remains of concern, it is unlikely to be the largest source of native vegetation change in the ACT. Chronic degradation of habitat condition, mainly in fragmented landscapes, continues to be a significant problem in the ACT there are many increasing threats due to development and climate change. Climate change has led to an increased occurrence of dieback in the ACT with a significant increase in the incidence of dieback in Blakely's Red Gum (*E. blakelyi*).

Targets	Achievements since 2009
Endangered Species and Communities	52 species and 3 ecological communities are listed as threatened in the ACT. [7 critically endangered, 18 endangered, 26 vulnerable, 1 regionally conservation dependent, 3 ecological communities endangered). There have been, 17 additional species listed as threatened and 7 species that have been transferred to the critically endangered category to align with their Commonwealth status. Three ecological communities are listed as endangered: Natural Temperate Grassland, Yellow Box–Red Gum Grassy Woodland and High-Country Bogs and Associated Fens. 70% of woodland, grassland and open forest communities remain outside conservation areas. Grasslands and woodlands are the least represented. 50% of Yellow Box–Red Gum Grassy Woodland outside conservation areas. 46% of *Aprasia* is outside conservation areas. Of the three ecological communities listed as endangered in the ACT, only High-Country Bogs and Associated Fens are fully protected in ACT conservation areas. Natural Temperate Grassland has just over half of its known distribution in ACT conservation areas, and Yellow Box–Red Gum Grassy Woodland has only 30% reserved. However, both Natural Temperate Grasslands and Yellow Box–Red Gum Grassy Woodland have substantial proportions of their extent on national land at nearly 30% and 20% respectively and are subject to management as required under the EPBC Act. Over half of the known threatened plant sites in the ACT are in reserves or on other land managed by the ACT Parks and Conservation Service (PCS). An additional 20% occur on national land, which is managed by the National Capital Authority. Despite this, nearly half of the ACT's Yellow Box–Red Gum Grassy Woodland is not reserved, and some 20% of Natural Temperate Grasslands are also unreserved. The low levels of reservation add to the pressures on these communities and the species they support. For the 11 vegetation classes assessed, 8 had more than 80% of their extent protected, and another 2 had over 60% of their extent protected. The most under-represented vegetation class was Southern Tableland Grassy Woodlands which only has 30% of its extent in conservation areas.
Urban Biodiversity	Activities to improve urban biodiversity have included Healthy Waterways projects, improvements in new greenfield developments, the Offset Reserves system, education through community development initiatives such as Bush on the Boundary, cat education programs, localised revegetation and other activities supported through Nature in the City grants, and citizen science such as Canberra Nature Map. However, there is still a need to assess urban biodiversity and address connectivity of habitat. One of the biggest pressures is the level of urban development, which has a focus on infill rather than development of new areas.

Red = Not progressing well towards targets. Needs a lot more work
Orange = Some progress made towards targets but still needs work
Green = Good progress made towards targets.

Appendix 2

List of Critical Species

» MNES (Federal)
» ACT listings

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Birds							
Critically Endangered	*Anthochaera phrygia*	Regent Honeyeater	1997: Declared Endangered 2015: Transferred from Endangered to Critically Endangered (Commonwealth) due to assessment of additional data 2019: Listed as Critically Endangered in line with Commonwealth	» Clearing, fragmentation and degradation of woodland dominated by box-ironbark » Competition at suitable breeding sites and high rates of nest predation	Condition declining*	High confidence (monitoring data support trend assessment)	See Regent Honeyeater (*Anthochaera phygia*) Action Plan and Progress Report
Critically Endangered	*Lathamus discolor*	Swift Parrot	1997: Declared Endangered 2016: Transferred from Endangered to Critically Endangered (Commonwealth) following assessment of additional information 2019: Recommended to be listed as Critically Endangered in line with Commonwealth	» Habitat loss and alteration across the mainland and Tasmanian range » Fire » Collision mortality » Competition for resources within altered habitats » Psittacine Beak and Feather Disease » Illegal wildlife capture and trading	Condition declining*	High confidence (monitoring data support trend assessment)	See Swift Parrot (*Lathamus discolor*) Action Plan and Progress Report
Endangered	*Botaurus poiciloptilus*	Australasian Bittern	2011: Declared Endangered (Commonwealth) 2019: Recommended to be listed as Endangered in line with Commonwealth	The loss or alteration of wetland habitats due to clearing for urban and agricultural development Predation by introduced vertebrate pests such as foxes and cats The primary purpose of urban wetlands (stormwater control) resulting in fluctuating water levels Reduced water quality as a result of increasing salinity, siltation and pollution	Condition declining*	Low confidence (expert experience/ observation with minimal data)	See priority wetland habitat management actions in Action Plan for Listed Migratory Species 2018 See also Nature Conservation (Australasian Bittern) Conservation Advice 2019

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Endangered	*Rostratula australis*	Australian Painted Snipe	2003: Declared Vulnerable (Commonwealth) 2013: Declared Endangered (Commonwealth) 2019: Recommended to be listed as Endangered in line with Commonwealth	» The loss and degradation of wetlands, through drainage and the diversion of water for agriculture and reservoirs In NSW, the threats are summarised as: » Drainage of breeding sites in wetlands (particularly in the Murray-Darling Basin) » Reduced water quality from siltation and pollution » Predation by foxes and feral cats » Use of herbicides, insecticides and other chemicals near wetlands » Grazing and associated frequent burning of wetlands » Exotic weeds and invasive native plants degrading wetland habitat » Poor understanding of the species' breeding ecology	Unknown*	Low confidence (expert experience/ observation with minimal data)	See priority wetland habitat management actions in Action Plan for Listed Migratory Species 2018 See also Nature Conservation (Australian Painted Snipe) Conservation Advice 2019
Vulnerable	*Melanodryas cucullata cucullata*	Hooded Robin	1997: Declared Vulnerable	» Loss and modification of grassy woodland habitat » Loss of perching sites essential for foraging (removal of timber and litter) » High levels of nest predation » Inappropriate fire regimes » Predation by feral and/or uncontrolled domestic animals (foxes, dogs and cats) » Invasion of key habitats by introduced pasture and weeds » Uncontrolled grazing by livestock » Clearing of both living and dead trees » Rural tree dieback	Condition declining	High confidence (monitoring data support trend assessment)	See management actions in Woodland Conservation Strategy and Action Plans and Progress Report
Vulnerable	*Polytelis swainsonii*	Superb Parrot	1997: Declared Vulnerable 2000: Vulnerable (Commonwealth)	» Habitat loss » Climate change » Nest competition » Secondary / potential threats: urbanisation, vehicle strike, predation, poisoning, illegal trade, Psittacine beak and feather disease	Condition stable	Moderate Confidence (some data to support trend assessment	See Superb Parrot Action Plan and Progress Report

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Vulnerable	*Climacteris picumnus victoriae*	Brown Treecreeper	1997:Declared Vulnerable	» Decline in quality and quantity of woodland habitat » Removal of fallen timber and litter and inappropriate fire regimes » Predation by feral and/or uncontrolled domestic animals (foxes, dogs and cats) » Invasion of key habitats by introduced pasture and weeds » Uncontrolled grazing by livestock » Clearing of both living and dead trees » Rural tree dieback	Condition declining	High confidence (monitoring data support trend assessment)	See management actions in Woodland Conservation Strategy and Action Plans and Progress Report
Vulnerable	*Grantiella picta*	Painted Honeyeater	1998: Declared Vulnerable	» Habitat loss through clearing of breeding and non-breeding habitat » Habitat degradation by grazing of livestock, native macropods and rabbits and lack of recruitment » Removal of mistletoe from trees on rural land and in production forests » Competition with the aggressive Noisy Miner » Nest predation by over-abundant Pied Currawongs, Pied and Grey Butcherbirds, and crows and ravens	Condition declining*	Low confidence (expert experience/ observation with minimal data)	See management actions in Woodland Conservation Strategy and Action Plans and Progress Report
Vulnerable	*Daphoenositta chrysoptera*	Varied Sittella	2003: Declared Vulnerable	» Decline in the quantity and quality of woodland habitat » Tree clearing, small-scale clearing for fence lines and road verges, tidying up on farms, firewood collection » Rural tree decline » Loss of paddock trees » Overgrazing » Fragmentation of habitat » Invasive weeds	Condition stable	High confidence (monitoring data support trend assessment)	See management actions in Woodland Conservation Strategy and Action Plans and Progress Report
Vulnerable	*Lalage tricolor*	White-winged Triller	2003: Declared Vulnerable	» Decline in the quality and quantity of woodland habitat » Removal of fallen timber and overgrazing leading to a loss of complexity	Condition declining	High confidence (monitoring data support trend assessment)	See management actions in Woodland Conservation Strategy and Action Plans and Progress Report

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Vulnerable	*Hieraaetus morphnoides*	Little Eagle	2008: Declared vulnerable	» Decline in the quality and quantity of woodland habitat » Urbanisation and associated human activity » Increased competition for food and nest sites with Wedge-tailed Eagles » Use of pindone for rabbit control (potential)	Condition stable	High confidence (monitoring data support trend assessment)	See Little Eagle Action Plan
Vulnerable	*Calyptorhynchus lathami lathami*	Glossy Black-cockatoo	2010: Declared vulnerable	» Degradation, loss and fragmentation of foraging and breeding habitat » The loss of canopy seed banks of feed trees by clearing or regular burning, as well as poor regeneration of these trees due to grazing, » Predation and competition for nest hollows (potential) » Illegal harvesting (potential) » Climate change	Condition declining*	Moderate Confidence (some data to support trend assessment	See Glossy Black-cockatoo Action Plan
Vulnerable	*Petroica boodang*	Scarlet Robin	2015: Declared Vulnerable	» Open forest / woodland habitat loss and degradation » Predation (native and non-native spp.) » Climate change » Competition (e.g. noisy miners)	Condition stable	High confidence (monitoring data support trend assessment)	See Scarlet Robin Action Plan
Amphibias							
Critically Endangered	*Pseudophryne pengilleyi*	Northern Corroboree Frog	1996: Declared Vulnerable 2003: Declared Endangered (due to decline in sp.) 2013: Transferred to Critically Endangered (Commonwealth) due to assessment of additional information 2019: Recommended to be listed as Critically Endangered in line with Commonwealth	» Disease (amphibian chytrid fungus Batrachochytrium dendrobatidis) » Fire » Climate change » Feral animals » Weeds » Habitat disturbance and degradation	Condition stable » Surviving only as captive population. » Reintroduction efforts underway	High confidence (monitoring data support trend assessment)	See Northern Corroboree Action Plan

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Critically Endangered (locally extinct)	*Litoria castanea*	Yellow-spotted Bell Frog	2000: Declared Endangered (Commonwealth) 2019: Transferred from Endangered to Critically Endangered due to assessment of additional info 2019: Recommended to be listed as Critically Endangered in line with Commonwealth	» Amphibian chytrid fungus » Infection from myxosporean parasites » Habitat loss and degradation through clearing, trampling, fragmentation, altered hydrology, salinity » Small population sizes and population fragmentation » Chemicals » Climate change (temperature increase, extreme weather events and droughts)	Condition stable » Locally extinct	Moderate Confidence (some data to support trend assessment	The species is considered to be locally extinct. Reintroductions are not currently proposed but could be considered if broad-scale threats are managed.
Vulnerable (locally extinct)	*Litoria aurea*	Green and Golden Bell Frog	2000: Declared Vulnerable (Commonwealth) 2019: Recommended to be listed as Vulnerable in line with Commonwealth	National: » Habitat destruction, degradation and fragmentation » Changes to the structure and diversity of aquatic vegetation » Predation of eggs and tadpoles by plague minnow and, to a lesser extent, European Carp, Goldfish, Brown Trout and Rainbow Trout » Infection with amphibian chytrid fungus » Changes to hydrology, including inappropriate opening of coastal lagoon estuaries and changes to flow/ flooding regimes of streams and wetlands » Changes to water quality » Intensification of public access to habitat	Condition stable » Locally extinct. Reintroduction planning taking place. Small local population nearby in NSW (Captains Flat)	Moderate Confidence (some data to support trend assessment	The species is considered to be locally extinct. Reintroductions are not currently proposed but could be considered if broad-scale threats are managed.
Vulnerable (locally extinct)	*Litoria raniformis*	Southern Bell Frog	2000: Declared Vulnerable (Commonwealth) 2019: Recommended to be listed as Vulnerable in line with Commonwealth	National: » Habitat loss and degradation » Barriers to movement » Predation » Disease » Exposure to biocides	Locally extinct	Moderate Confidence (some data to support trend assessment	The species is considered to be locally extinct. Reintroductions are not currently proposed but could be considered if broad-scale threats are managed.

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Vulnerable	*Litoria verreauxii alpina*	Alpine Tree Frog	2000: Declared Vulnerable (Commonwealth) 2019: Recommended to be listed as Vulnerable in line with Commonwealth	National: » Infection with amphibian chytrid fungus » Trampling by feral horses and cattle » Invasion of alpine bogs and fens by exotic weeds » Pollution » Changes to natural water flows » Climate change including increased UV-B radiation » Habitat loss through fire, construction and development	Unknown	Low confidence (expert experience/ observation with minimal data)	None – Status uncertain but may be extinct in the ACT
Reptiles							
Endangered	*Tympanocryptis pinguicolla*	Grassland Earless Dragon	1996: Declared Endangered	» Loss, fragmentation and degradation of grassland habitat (urban development, agriculture) » Wildfire / inappropriate fire regimes » Weed invasion » Climate change » More frequent drought » Loss of genetic diversity » Cultivation and pasture improvement » Overgrazing (kangaroos, rabbits, stock) or short mowing » Development of excessive vegetation biomass » Predation by cats, dogs and foxes » Increased predation by native animals	Condition declining	High confidence (monitoring data support trend assessment)	See Grassland Earless Dragon Action Plan
Vulnerable	*Delma impar*	Striped Legless Lizard	1996: Declared Vulnerable	» Loss and fragmentation of habitat through clearing of native grasslands for urban, industrial and infrastructure development and for agricultural purposes » Modification and degradation of native grassland habitat through incompatible and inadequate land management practices, weed invasion » Other potential effects of urbanisation, including increased incidence of predation and frequency of fires » Climate change	Condition stable	Low confidence (expert experience/ observation with minimal data)	See Striped Legless Lizard Action Plan

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Vulnerable	*Aprasia parapulchella*	Pink-tailed Worm-lizard	2008: Declared Vulnerable	» Loss and fragmentation of habitat by urban development and associated infrastructure » Incompatible and inadequate land management practices, including fertilizer application, overgrazing and the spread of invasive weeds » Inappropriate fire regimes » Removal of loose surface rock » Predation (by native and exotic species) » Build-up of vegetation biomass and leaf litter altering thermoregulatory opportunities	Unknown	Low confidence (expert experience/ observation with minimal data)	See Pink-tailed Worm-lizard Action Plan
Arthropos							
Endangered	*Synemon plana*	Golden Sun Moth	1996: Declared Endangered	» Loss, fragmentation and degradation of grassland habitat » Weed invasion (dilution of food plants and altering grassland structure) » Wildfire or inappropriate fire regimes » Herbage mass extremes » Cultivation and pasture improvement » Herbicides and pesticides » Excess nutrients » Shading (by buildings and planted trees) » Altered drainage » Climate change	Condition stable	High confidence (monitoring data support trend assessment)	See Golden Sun Moth Action Plan
Vulnerable	*Perunga ochracea*	Perunga Grasshopper	1997: Declared Endangered	» Loss, fragmentation and degradation of grassland habitat » Climate change	Condition declining	Low confidence (expert experience/ observation with minimal data)	See Perunga Grasshopper Action Plan

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Vulnerable	*Euastacus armatus*	Murray River Crayfish	1997: Declared vulnerable	» Overfishing » Removal of riparian vegetation » Sedimentation » River regulation » Residential development » Reduction in water quality » Fires » Invasive species and disease » Climate change	Unknown	Low confidence (expert experience/ observation with minimal data)	See Murray River Crayfish Action Plan
Fish							
Endangered	*Macquaria australasica*	Macquarie Perch	1997: Declared Endangered	» Habitat modification » Dams causing alterations to natural flows, movement barriers, and releasing colder hypoxic water (cold water pollution) » Sedimentation of streams and reservoirs resulting in decline of habitat quality and quantity, reducing availability of prey, and smothering eggs and preventing their lodgement » River regulation causing barriers to fish passage for feeding or breeding habitat » Overfishing » Reduction in water quality (including pollutant discharges, changes to thermal regimes, and sedimentation) » Alien species (e.g. Brown Trout, Rainbow Trout, Carp, Goldfish, Redfin Perch, Eastern Gambusia, and Oriental Weatherloach) » Climate change » Fire » Low genetic diversity » Reduction in spawning habitat availability » Predation by birds (primarily cormorants)	Unknown	Low confidence (expert experience/ observation without much data)	Macquarie Perch Action Plan

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Endangered	*Maccullochella macquariensis*	Trout Cod	1997: Declared Endangered	» Habitat modification (sedimentation, cold water pollution, clearing or degradation of riparian vegetation) » River regulation (reduced flows downstream of dams) » Barriers to fish passage » Overfishing » Sedimentation » Reduction in water quality » Alien species » Climate change » Hybridisation and reduced genetic diversity	Condition stable	Moderate Confidence (some data to support trend assessment	See Trout Cod Action Plan
Endangerd	*Bidyanus bidyanus*	Silver Perch	2001: Declared Vulnerable	» River regulation (reduction of water flow downstream of dams) » Barriers to fish passage » Introduced species and disease » Habitat modification » Reduction in water quality » Sedimentation » Historical overfishing » Climate change	Condition stable Functionally extinct in ACT	High confidence (monitoring data support trend assessment)	See Silver Perch Action Plan
Vulnerable	*Gadopsis bispinosus*	Two-spined Blackfish	1997: Declared Vulnerable	» Habitat modification » River regulation » Barriers to fish passage » Sedimentation » Reduction in water quality » Introduction of alien species » Climate change » Fire » Reduction in spawning habitat availability	Condition stable	High confidence (monitoring data support trend assessment)	See Two-spined Blackfish Action Plan
Mammals							

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Endangerd	*Petrogale penicillata*	Brush-tailed Rock-wallaby	1996: Declared Endangered	» Historical hunting » Introduced predators (primarily, the red fox) » Introduced herbivores increase competition (primarily, the feral goat) » Wildfire and drought » Uncontrolled human disturbance » Hydatid disease	Condition stable » Exists as captive population	High confidence (monitoring data support trend assessment)	See Brush-tailed Rock-wallaby (*Petrogale penicllata*) Action Plan and Progress Report
Endangerd	*Pseudomys fumeus*	Smoky Mouse	1998: Declared Endangered	» Vegetation clearance (loss and fragmentation of habitat) » Inappropriate fire regimes » Predation (primarily by fox and cat) » Climate change	Unknown	Low confidence (expert experience/ observation without much data)	See Smoky Mouse (*Pseudomys fumeus*) Action Plan
Endangered	*Dasyurus viverrinus*	Eastern Quoll	2015: Declared Endangered (Commonwealth) 2019: Recommended to be listed as Endangered in line with Commonwealth	National: » Predation by feral cats, red foxes and dogs » Disease » Non-target poisoning associated with 1080 and rodent control programs » Road mortality » Extreme weather events associated with climate change	Condition Improving » Exists only as translocated population in predator-proof enclosure	High confidence (monitoring data support trend assessment)	Actions involve ongoing management of translocated population within Mulligans Flat Sanctuary.
Endangered	*Isoodon obesulus obesulus*	Southern Brown Bandicoot (Eastern)	2001: Declared Endangered (Commonwealth) 2019: Recommended to be listed as Endangered in line with Commonwealth	National: » Predation by foxes, feral and domestic cats and to a lesser extent dogs » Habitat loss, fragmentation and degradation » Too frequent and extensive burning » Road mortality » Climate change adversely affecting habitat quality » Displacement by high rabbit densities » Disease -possibly toxoplasmosis » Timber harvesting » Reduced genetic diversity » Poisoning associated with control of non-native predators	Unknown » population exists behind predator proof fencing at Tidbinbilla NR	Low confidence (expert experience/ observation without much data)	Actions involve ongoing management of captive population.

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Vulnerable	*Dasyurus maculatus maculatus*	Spotted-tailed Quoll	2003: Declared Vulnerable	» Habitat loss, fragmentation and degradation » Competition and predation » Poisoning » Killing by humans	Condition stable » Transient individuals only, no resident population known	Low confidence (expert experience/ observation without much data)	See Spotted-tailed Quoll Action Plan
Vulnerable	*Mastacomys fuscus mordicus*	Broad-toothed Rat (mainland)	2016: Declared Vulnerable (Commonwealth) following assessment of additional info 2019: Recommended to be listed as Vulnerable in line with Commonwealth	National: » Climate change » Too frequent burning » Habitat loss, fragmentation and degradation due to feral herbivores » Weed invasion » Competition with native rodents for food » Predation by foxes and feral cats	Condition declining	Moderate Confidence (some data to support trend assessment	See Nature Conservation (Broad-toothed Rat) Conservation Advice 2019
Vulnerable	*Petauroides volans*	Greater Glider	2016: Declared Vulnerable (Commonwealth) following assessment of additional info 2019: Recommended to be listed as Vulnerable in line with Commonwealth	National: » Habitat loss, fragmentation through clearing » Inappropriate fire regimes » Climate change reducing habitat suitability	Condition stable	Moderate Confidence (some data to support trend assessment	See Nature Conservation (Greater Glider) Conservation Advice 2019
Vulnerable	*Phascolarctos cinereus*	Koala (QLD/ NSW/ACT population)	2012: Declared as Vulnerable (Commonwealth) 2019: Recommended to be listed as Vulnerable in line with Commonwealth	National: » Loss and fragmentation of habitat, » Vehicle strike, » Disease, » Predation by dogs » Drought and incidences of extreme heat are also known to cause very significant mortality, and post-drought recovery may be substantially impaired by the range of other threatening factors	Unknown » No known wild population in the ACT, some irregular and unconfirmed sightings	Low confidence (expert experience/ observation without much data)	See Nature Conservation (Koala) Conservation Advice 2019

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Vulnerable	*Pseudomys novaehollandiae*	New Holland Mouse	2010: Declared Vulnerable (Commonwealth) 2019: Recommended to be listed as Vulnerable in line with Commonwealth (presumed extinct in the ACT prior to reintroduction to Mulligans Sanctuary)	National: » Inappropriate fire regimes » Predation by feral cat and red foxes » Habitat loss, fragmentation, and degradation » Lower rainfall and more frequent droughts related to climate change	Condition stable » Locally extinct with the exception of a small reintroduced population at Mulligans Flat Sanctuary (behind predator proof fencing)	High confidence (monitoring data support trend assessment)	See Nature Conservation (New Holland Mouse) Conservation Advice 2019 Actions involve ongoing management of captive population with potential for future reintroductions.
Vulnerable	*Pteropus poliocephalus*	Grey-headed Flying-fox	2001: Declared Vulnerable (Commonwealth) 2019: Recommended to be listed as Vulnerable in line with Commonwealth	» Entrapment in fine gauge netting loosely draped over backyard fruit trees » Loss of foraging and roosting habitat through clearance of vegetation for development or agriculture » Climate change	Unknown » Local numbers increasing at local seasonal camp	Low confidence (expert experience/ observation without much data)	See Nature Conservation (Grey-headed Flying-fox) Conservation Advice 2019
Regionally Conservation Dependent	*Bettongia gaimardi*	Eastern Bettong	2000: (subspecies *gaimardi*) (Commonwealth)	National: » Predation by foxes (and feral cats) » Habitat clearing/fragmentation of its dry forest and woodland habitat » Habitat degradation and competition from livestock/introduced herbivores including overgrazing by livestock and rabbits » Inappropriate fire regimes » Viral or other diseases » Climate change	Condition Improving » Exists only as translocated population in predator-proof enclosure	High confidence (monitoring data support trend assessment)	See Nature Conservation (Eastern Bettong) Conservation Advice 2019 Actions involve ongoing management of captive population with potential for future reintroductions.
Plants							
Critically Endangerd	*Caladenia actensis*	Canberra Spider Orchid	2005: Declared Endangered 2005: Listed as Critically Endangered (Commonwealth) 2019: Recommended to be listed as Critically Endangered in line with Commonwealth	» Climate change » Disturbance such as trampling, grazing, development and maintenance of infrastructure, and wildfire » Disease » Low genetic diversity » Life history traits: short flowering period, dependence on a single, sub-family of wasps for pollination and an important association with soil fungi	Unknown	Low confidence (expert experience/ observation with minimal data)	See Canberra Spider Orchid Action Plan

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Critically Endangerd	*Corunastylis ectopa*	Brindabella Midge Orchid	2005: Declared Endangered 2005: Declared Critically Endangered (Commonwealth) 2019: Recommended to be listed as Critically Endangered in line with Commonwealth	» Severely restricted distribution (1 population) » Life cycle traits (period of dormancy when its presence is not evident, short flowering period, and association with soil fungi) » High sensitivity to disturbance such as erosion, roadworks, shrub growth and weed invasion, herbicides » Illegal collection	Unknown	Low confidence (expert experience/ observation with minimal data)	See Brindabella Midge Orchid (*Corunastylis ectopa*) Action Plan and Progress Report
Critically Endangerd	*Pterostylis oreophila*	Kiandra Greenhood	2012: Declared Critically Endangered (Commonwealth) 2019: Recommended to be listed as Critically Endangered in line with Commonwealth	National: » Grazing and trampling » Altered hydrology due to the impacts of grazing » Soil disturbance by rooting by feral pigs and trampling » Weed invasion » Inappropriate land management including Inappropriate fire regimes » Plant collection Namadgi: » Pest animals leading to overgrazing, soil disturbance and erosion » Weeds	Unknown	Low confidence (expert experience/ observation with minimal data)	See Nature Conservation (Kiandra Greenhood) Conservation Advice 2019
Endangerd	*Gentiana baeuerlenii*	Baeuerlen's Gentian	1996: Declared Endangered	» Land clearing and grazing, particularly in times of drought	Condition declining » Possibly extinct	Moderate Confidence (some data to support trend assessment	See Baeuerlen's Gentian Action Plan
Endangerd	*Prasophyllum petilum*	Tarengo Leek Orchid	1996: Declared Endangered	» Restricted range and population size (1 population) » Vulnerable to environmental change and localised disturbance » Disturbance by Sulphur-Crested Cockatoos » Competition or overcrowding from native and non-native species » Climate change	Condition stable	Low confidence (expert experience/ observation without much data)	See Tarengo Leek Orchid Action Plan and Progress Report

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Endangerd	*Rutidosis leptorrynchoides*	Button Wrinklewort	1996: Declared Endangered	» Habitat loss from agriculture and urban development » Small sites are particularly vulnerable to localised disturbance (human activity, roadside maintenance, waste dumping, inappropriate mowing, parking vehicles) » Weed invasion » Shading and competition with understorey and shrub vegetation » Heavy stock grazing » Erosion of genetic diversity » More frequent drought	Condition stable	High confidence (monitoring data support trend assessment)	See Button Wrinklewort Action Plan
Endangerd	*Swainsona recta*	Small Purple Pea	1996: Declared Endangered	» Loss, degradation and fragmentation of habitat (as a result of urban development and agriculture) » Small, fragmented populations are vulnerable to localised disturbance and stochastic events including climate change, browsing, invasive plants, inappropriate fire regimes, and browsing » Reduced genetic diversity	Condition stable	Moderate Confidence (some data to support trend assessment	See Small Purple Pea (*Swainsona recta*) Action Plan and Progress Report
Endangerd	*Muehlenbeckia tuggeranong*	Tuggeranong Lignum	1998: Declared Endangered	» The species ability to sexually reproduce appears to be very limited – the plants are predominantly dioecious and only one female plant is known to exist » Likely low genetic diversity » Physical disturbance (recreational activity, periodic flooding, wildfire, grazing by macropods) » Weeds	Condition stable	High confidence (monitoring data support trend assessment)	See Tuggeranong Lignum (*Muehlenbeckia tuggeranong*) Action Plan
Endangerd	*Lepidium ginninderrense*	Ginninderra Peppercress	2001: Declared Endangered	» Habitat loss from urban development » Habitat degradation associated with land management and / or visitor activities » Disturbance to the existing drainage patterns	Unknown	Low confidence (expert experience/ observation with minimal data)	See Ginninderra Peppercress Action Plan

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Endangerd	*Bossiaea grayi*	Murrumbidgee Bossiaea	2012: Declared Endangered	» Population range reduction and further fragmentation of populations » Dieback (unknown cause) » Weed infestation » Mechanical disturbance associated with forest harvesting	Unknown	Low confidence (expert experience/ observation with minimal data)	See Murrumbidgee Bossiaea Action Plan
Vulnerable	*Eucalyptus aggregata*	Black Gum	2015: Declared Vulnerable (Commonwealth) following assessment of information from a public nomination 2019: Recommended to be listed as Vulnerable in line with Commonwealth	» Mortality as a result of habitat clearance » Suppression of gene flow due to habitat fragmentation » Lack of recruitment and genetic hybridisation	Condition stable (Species only present in ACT as single patch of plants)	Moderate Confidence (some data to support trend assessment	See Nature Conservation (Black Gum) Conservation Advice 2019
Vulnerable	*Pomaderris pallida*	Pale Pomaderris	2008: Declared Vulnerable (Commonwealth) 2019: Recommended to be listed as Vulnerable in line with Commonwealth	National: » Rural residential development, weed competition (particularly blackberry) and browsing by Feral Goats, inappropriate fire regimes » Increasing fragmentation and loss of remnants NSW: » Browsing by other feral animals including deer, goats and potentially horses and grazing by livestock and kangaroos » Sediment runoff from fire trails » Flood damage in smaller riparian populations where frequent flooding may disrupt the lifecycle to the extent that the soil seedbank may be affected » Low genetic diversity in isolated small populations that are likely to be at higher risk of loss from stochastic events » Lack of knowledge regarding dormancy thresholds, seed vigour and seedling and plant performance for this species	Condition stable	Low confidence (expert experience/ observation with minimal data)	See Nature Conservation (Pale Pomaderris) Conservation Advice 2019

Current listing status	Scientific name	Common name	Listing history	Relevant threatening processes (derived from Action Plans or Conservation Advice documents)	Condition trend (2009 to present) * rare in the ACT – rating reflects national status	Confidence in Assessment	Priority investments/ actions for recovery
Vulnerable	*Thesium australe*	Austral Toadflax	2013: Declared Vulnerable (Commonwealth) 2019: Recommended to be listed as Vulnerable in line with Commonwealth	» Small populations and numbers make them susceptible to impacts » Heavy grazing » Development of dense shrub or tree cover » Loss and degradation of habitat and/or populations » Weed invasion	Unknown	Low confidence (expert experience/ observation with minimal data)	See Nature Conservation (Austral Toadflax) Conservation Advice 2019

Ecological communities					Extent of EC	Condition trend	Confidence in assessment	
Endangered	High Country Bogs and Associated Fens	n/a	2009: Declared Endangered (Commonwealth) 2019: listed as endangered in line with Commonwealth	» Climate change and its associated impacts » Fire » Exotic plant invasion » Trampling and wallowing by hooved pest animals » Tourism and recreational activities	Stable	Unknown	Low confidence (expert experience/ observation with minimal data)	See 2018 ACT Aquatic and Riparian Conservation Strategy
Critically endangered	Natural Temperate Grassland	n/a	2016: Declared Critically Endangered (Commonwealth) 1996: Declared Endangered 2020: Transferred from Endangered to Critically Endangered.	» The effects of historic habitat loss (such as fragmentation effects) » Ongoing loss and modification of native » grasslands, mainly due to agricultural and urban development » Invasive plants and animals » (likely to intensify over the next few decades) » Ecologically inappropriate disturbance regimes, particularly a decline in disturbance frequency in productive grasslands » Climate change	Stable	Condition Improving	Moderate Confidence (some data to support trend assessment	See 2017 ACT Native Grassland Conservation Strategy
Critically endangered	Yellow Box/Red Gum Grassy Woodland	n/a	2006: Declared Critically Endangered (Commonwealth) 1997: Declared Endangered 2020: Transferred from Endangered to Critically Endangered due to ACT recognition of national importance of EC in the territory	» Urbanisation » Inappropriate disturbance regimes » Invasive plants » Pest » Animals » Eucalypt dieback » Climate change	Decreasing	Condition declining	Moderate Confidence (some data to support trend assessment	See 2019 ACT Native Woodland Conservation Strategy

Appendix 3

Listening Report

Natural Resource Management plan

The ACT Government is developing a new plan for managing our natural resources. In developing this plan, we recognise that managing natural resources is a shared responsibility. The Canberra community's contribution is vital to ensure the plan reflects community knowledge and aspirations as well as highlighting the key role that everyone has in delivering the plan.

FIGURE 1 Haig Park Markets Sunday 18 April 2021

Natural Resource Management (NRM) is the integrated management of the natural resources that make up Australia's landscapes, such as land, water, soil, plants and animals. That is, our land, water and biodiversity and cultural assets. NRM takes account of human activities and natural processes to ensure they are balanced and carefully managed to deliver the best outcomes for today's needs and for future generations. NRM also considers the varied benefits provided to the community by the natural environment, which are becoming known as 'ecosystem services'. These services include natural pollination of crops, clean air, extreme weather mitigation and community mental and physical wellbeing. Ecosystem services are often integral to the provision of clean drinking water, the decomposition of wastes, and resilience and productivity of food production.

Two separate NRM Plans have been developed for the ACT over the last 20 years. The first plan was launched in 2004 and the most recent plan, Bush Capital Legacy – Plan for Managing the Natural Resources of the ACT, was launched in 2009. These plans have provided a solid framework for NRM planning and implementation in the ACT.

It is now time to build on this work and develop a new ACT NRM Plan that reflects current community knowledge and aspirations, the latest scientific data and emerging challenges such as climate change. The new plan will look to the future and provide goals, actions and investments for the next 20 years. It will reflect the latest information, Ngunnawal values and aspirations, changing community aspirations and address existing and emerging challenges to protect our natural resources.

The conversation

The consultation sought feedback from the ACT community on the key areas the NRM Plan should focus on, and what the key opportunities and threats are for natural resource management over the next couple of decades.

Over the ten-week consultation period spanning 1 April 2021 to 15 June 2021, we connected with community both online and face to face. We ran an online survey that was available on the YourSay Conversations platform for the ten-week period receiving 87 responses. We hosted seven drop-in sessions connecting with over 60 people at the following locations:

- The Belconnen Arts Centre: Monday 19 April
- Downer Community Centre: Tuesday 20 April
- Forde Community Centre: Wednesday 21 April
- Tuggeranong Community Centre: Thursday 22 April
- Weston Creek Community Centre: Tuesday 27 April
- Haigh Park Markets: Sunday 18 April and Sunday 2 May

We engaged directly with our stakeholders and their member groups. We established an NRM plan advisory group with representatives of the NRM and wider community including the ACT community councils, Landcare ACT, the ACT Conservation Council, The Rural Landholders Association, Landcare Volunteers and the Dhawura Ngunnawal Caring for Country Committee.

In addition, we held face-to-face and virtual meetings with 13 internal ACT Government Departments and a further 16 Community Groups (see attachment A), four of which were facilitated by Landcare ACT and the ACT Catchment groups. We contacted all ACT representative Aboriginal organisations (RAOs) and invited them to comment and engage on the discussion paper and future content of the plan. To assist these conversations a targeted Ngunnawal and Aboriginal community survey sent out to get feedback on specific Ngunnawal NRM issues.

Who was engaged

The face-to-face and virtual consultation meetings were attended by 90 people including representatives of all of the catchment and conservation groups in the ACT.

87 submissions were received via the YourSay Conversations platform and a further 16 written submissions were received from various organisations and Individuals via email. A consultation report was provided by Landcare ACT on behalf of the three catchment groups and the Rural Landholders Association.

We also received feedback from stakeholder discussions conducted by other non-government agencies such as the ACT Conservation Council and ACT and Region Catchment Coordinating Committee.

To maximise our engagement reach we attended multiple forums with stakeholders across our community to ensure we really captured the information we needed to develop our draft NRM Plan.

Key insights from the community

General Comments

There was a suggestion to consider an alternative title for the plan as natural resource management deemed not appropriate by some groups- suggesting that it is more caring for country.

A range of additional comments around cross border consideration, acknowledging the ACT's place within the Capital Region. While the NRM Plan will focus on actions and investment within the ACT, it should, as a minimum, consider cross-border impacts and investigate mechanisms to reduce adverse environmental effects arising from outside of ACT.

The Vision

- A particular focus area of the community comments was on the draft vision which was put forward in the discussion paper that it should be more specific about what we are intending to achieve
- Other suggestions put forward to consider in the vision:
  - Ngunnawal cultural values and aspirations
  - Incorporation of climate resilience
  - The connections between people and nature

Guiding Principles

1. Overall, there was general agreement that the guiding principles were good but could be expressed in a simpler form to make it a lot clearer about what is being discussed
2. Should be practical and evidence-based objectives and strategies with fixed baselines and agreed conservation targets for protecting key environmental assets within the landscape incorporating trends and impacts, including cumulative impacts

2009 Plan

1. A review of the previous NRM plan be prepared to determine to what extent it has been implemented (both intermediate (2015) tasks and progress towards long term (2030) tasks), and the reasons for unmet targets be identified so that elements with shortfalls can be enhanced in the new Plan.
2. need to include the lessons learnt from the prior NRM Plans

Key Focus Areas

1. Climate resilience is a primary consideration for all focus areas - biodiversity conservation, ecological function, healthy waterways, sustainable agriculture, and urban design and planning.
2. Strategic planning for land management and adoption of a stewardship approach the potential for an environmental stewardship program that rewards land holders for actively setting aside and managing land for environmental purposes.
3. The importance of the urban forest and urban reserves to be areas of connectivity and habitat for the indigenous flora and fauna.
4. Water security and water quality- Broaden it to total holistic water use in ACT – grey water reuse etc
5. the impact of bushfire hazard reduction measures on the ACT's environment and how best to manage the protection of life and property without compromising environmental values
6. Carbon offsetting – This is an under-explored option to incentivise landholder action in the ACT could have potential method to encourage large-scale restoration.

7. Need to identify the operational and action plans that underpin these focus areas
8. Riparian corridors being an opportunity to link remnant vegetation, provide a site for planting and increased greenery, as well as improve the condition of water both in and going out of the ACT
9. Novel ecosystems ie alternate ways of thinking about weeds and reducing weed loads need to be considered.
10. Need to account for the impact of human activities such as construction

Ngunnawal

1. Desire for better collaboration between the Ngunnawal and the ACT Gov and Non-Government Organisations
2. Cultural awareness training for landholders in ACT as awareness will be the first step towards appreciation and active involvement
3. Ngunnawal led education programs - resources for teachers and ParkCarers to help to inform people about Ngunnawal culture
4. Share responsibilities for Land and Water with Ngunnawal community- emphasis on co-management or partnership with traditional custodians
5. Cultural fire management including more on-ground trials of different types of management are needed with funding directed on-ground pilots.
6. Employment opportunities - Increasing opportunities for Ngunnawal people to work in the NRM space which will improve involvement and understanding from both sides
7. Promotion of Ngunnawal language, re-naming places, animals, plants incorporating Ngunnawal language.

Governance

1. There is also strong emphasis on needs to ensure there is comprehensive monitoring, evaluation and compliance regimes in place to check whether outcomes are being achieved, and mechanisms to adapt the NRM plan and management accordingly.
2. Appropriate measures need to be in improving Interrelationships and communication between Government stakeholders
3. It is essential that representatives of the community that are concerned with and working in NRM are part of an advisory structure in the new plan.
4. Improved coordination across ACT Government Directorates to facilitate integrated policy approaches, delivery and on-going management.
5. Needs to include a reporting mechanism and determine what and who is accountable to the management and delivery of the plan.
6. There should be evaluations to measure the success of the plan past and future
7. There is no agricultural policy or minister in the ACT and that is something that needs to be addressed.
8. Consideration of recovery teams- in place ready to come in after disasters

What's Next?

Submissions and survey responses were considered in the development of the draft Natural Resource Management Plan. The draft plan will be available for comment in early 2022. Following community input on the draft plan a final draft of the plan will be submitted to the ACT Cabinet for consideration for adoption. The final ACT Natural Resource Management Plan is expected to be published in mid 2022.

You can register to receive project updates at epsddcomms@act.gov.au

To find out more about the Natural Resource Management Plan and other initiatives, policies and projects in Canberra visit www.yoursay.act.gov.au or follow us on Facebook at @EnvironPlan

Key Timings
Consultation on discussion paper - April – June 2021
Collation of feedback from the consultation on NRM Plan discussion paper – August-November 2021
Finalisation of Draft NRM plan – December 2021 - early 2022 We are here
Release of Draft NRM plan for public comment – Early 2022
Finalise NRM Plan – June – December 2022
Publication of NRM Plan – June – December 2022

Thank you for your feedback

959 People were reached via YourSay	**87** People completed the online Survey	**7** Drop-in sessions were held across 6 locations	**24** Workshops were held with stakeholders and community groups
160 Emails sent to organisations and individuals	**28,915** Audience reached by social media	**16** Items of written feedback received	

Attachment 1

Meetings with community groups

And a further 11 Community Environmental Groups took up this opportunity speaking directly to us or facilitated through the Landcare ACT and Catchment Group Networks including :

- ACT Conservation Council
- ACT Region Catchment Coordination Group
- Ginninderra Conservation Group
- Greening Australia
- Landcare ACT
- Molonglo Conservation Group
- Southern ACT Catchment Group
- The Canberra Orchid Society
- The Rural Landholders Association
- The Wentworth Group of Concerned Scientists
- UMCN

Submissions by community

Written submissions were received from 16 organisations, 2 Individuals

- Canberra Orchid Society
- Conservation Council ACT Region
- Friends of Grasslands
- Ginninderra Catchment Group
- Greening Australia
- ICON Water
- Landcare ACT
- Molonglo Conservation Group
- National Parks Association of the ACT Inc.
- Private individual
- Private individual
- Queanbeyan-Palerang Regional Council
- Rural Landholders Association
- Southern ACT Catchment Group
- Tuggeranong Community Council
- Wentworth Group of Concerned Scientists
- Weston Creek Community Council
- Yass Valley Council

ACT Government Departments

- Chief Minister, Treasury and Economic Development Directorate
- Transport Canberra and City Services
- Commissioner for Sustainability and the Environment
- The ACT Conservator of Flora and Fauna
- Environment Planning and Sustainable Development Directorate:
  - ACT Parks and Conservation Service
  - Bushfire and forestry
  - Biodiversity Planning and Policy
  - Biosecurity and Rural Services
  - Bushfire Recovery Team
  - Climate Change
  - Conservation Research
  - Traditional Custodian Engagement Team
  - Resilient Landscapes
  - Water Policy and Planning
  - ACT Heritage
  - ACT NRM