Australian Capital Territory

Nature Conservation (July 2020-June 2022) Biodiversity Research and Monitoring Program 2023*

Notifiable instrument NI2023–3

made under the

Nature Conservation Act 2014, s 25 (Biodiversity research and monitoring program—conservator to prepare)

---

1 Name of instrument

This instrument is the *Nature Conservation (July 2020-June 2022) Biodiversity Research and Monitoring Program 2023*.

2 Commencement

This instrument is taken to have commenced on 1 July 2020.

3 Biodiversity research and monitoring program

I have prepared the biodiversity research and monitoring program for the period 1 July 2020 to 30 June 2022 at schedule 1 to this instrument.

.

Bren Burkevics
Conservator of Flora and Fauna

9 October 2022

*Name amended under Legislation Act, s 60

Biodiversity Research and Monitoring Program July 2020-June 2022

Overview

This Biodiversity Research and Monitoring Program (BRAMP) July 2020-June 2022 is written to help the Conservator of Flora and Fauna (Conservator) generate evidence on and monitor the state of nature conservation, and the effective management of nature conservation, in the ACT.

The development of the BRAMP is a requirement of the Conservator under s.25 of the *Nature Conservation Act 2014* (Act). At the conclusion of the BRAMP, the Conservator is required to prepare a report on the implementation of the BRAMP.

A specific feature of BRAMP July 2020-June 2022 is that it goes beyond the requirements of s.25 of the Act to include research and monitoring not directly related to biodiversity, and in particular brings to effect activities under the Environment, Planning and Sustainable Directorate's Science Plan 2020-2025 (https://www.environment.act.gov.au/__data/assets/pdf_file/0009/1675233/science-plan-2020-25.pdf).

The Science Plan 2020-2025 has five Action Areas, and a set of 11 Research and Monitoring Themes. Each Action Area is addressed first, followed by a breakdown of research and monitoring projects under each Research and Monitoring Theme (Part Two).

PART ONE: Action Areas

1. AUTHORITATIVE SCIENCE ADVICE

Goals

1.1 Scientific staff are contemporary experts and provide reliable and timely advice

Key actions this period:

- Develop the urban biodiversity connectivity planning tool - to enable proactive strategic advice to urban planning teams (Conservation Research (CR) and collaborators)
- Maintain and support work of Wombat Management Working Group (CR/Parks and Conservation Service (PCS), working with community organisations)
- Develop checklist of conditions for Development Applications/Environmental Impact Statements/Environmental Significance Opinions (Conservator Liaison (CL)/Molonglo)
- Input into Planning Review process (CL/CR/PCS)
- Kangaroo density estimates on rural lands (budget-dependent) (CR/Resilient Landscapes (RL))
- Developing the 'Values Officer' role in fire operations (CR/PCS Fire, Forests and Roads (FFR) /Natural Resource Management (NRM))
- Continue provision of high-quality kangaroo management advice: fertility control, culling, road design, carcass use, captive populations, connectivity, rural lands (CR)
- Development of urban interface guidelines/codes for planning and development (CR-led, with FFR, Transport Canberra and City Services)

1.2 Scientific staff are supported to maintain professional expertise and continue professional development, through e.g. enabling their access to scientific literature, linkages with scientific institutions, participation in relevant scientific conferences, and receipt of relevant training

Key actions this period:

- Support staff to attend relevant conferences and access appropriate training
- Explore options to get access to scientific literature in more systematised way. Currently scientific staff require access to the literature, but are not provided it through ACT Government, so access it in a variety of ad hoc ways such as via university affiliations
- Hold events to enable development of relationships with research partners, including e.g. further "Ideas Mingles" with the Centre for Biodiversity Analysis.

2. TARGETED, WELL-DESIGNED RESEARCH AND MONITORING

**Note: specific research and monitoring projects and programs are reported in Part Two.*

Goals

2.1 All monitoring programs are scientifically robust, targeted and efficient; and collect the most appropriate data to evaluate and guide management actions

2.2 Monitoring efforts are designed in ways that enable relevant research questions to be addressed, and existing monitoring datasets are used to address relevant research questions

2.3 Research is relevant, robust, subject to independent critical scrutiny, co-developed with user groups, and results wherever possible in peer-reviewed publication of research findings

Key actions this period:

- These plus Action Area 2.7 are promoted through the rollout of the Science Directory, underpinned by a set of Science Planning Good Practice Guidance. This works through leaders prompting staff to enter their proposed/current projects into the Science Directory, which prompts them in the process to address relevant issues.

2.4 Citizen science collaborations are enhanced and strengthened

Key actions this period:

- Enhanced support to Canberra Nature Map (Conservation and Water Policy and Planning (CWPP)/CR/PCS), and continuation of projects engaging citizen science in monitoring (including the Little Eagle project, Canberra Spider Orchid project, FrogWatch, the Catchment Health Indicators Program (CHiPs), Ginninderra Catchment Group Eastern Long-necked Turtle monitoring project etc). Exploration of potential for collaboration with VegWatch on vegetation monitoring.

2.5 The social science and economics expertise within the Division is increased

2.6 Ngunnawal people are widely consulted with and engaged in research and monitoring efforts, and understanding is increased of how Ngunnawal cultural knowledge and practices can contribute to achieving EPSDD's conservation and management priorities, and how integrating Ngunnawal cultural knowledge and practices with formal scientific knowledge and practices can generate fresh understanding to advise and guide management

Key actions this period:

- Recruitment of a Ngunnawal Project Officer in CR, who will inter alia work with researchers to build links with Dharuwa Ngunnawal Caring for Country Committee (DNCCC) and the Ngunnawal community, and by proactive engagement of science staff from all teams with the Traditional Custodian Engagement team and DNCCC.

2.7 Research and monitoring priorities and outcomes have high visibility, in a variety of appropriate forms, within and beyond Government to maximise opportunities for collaboration and the impact of our work on biodiversity conservation, sustainability and liveability

Key actions this period: see above.

3.EMBED ADAPTIVE MANAGEMENT ACROSS EPSDD

Goals

3.1 The science, policy and implementation teams across the Environment Division are "interoperable", delivering joined-up strategic, evidence-based and adaptive management

3.2 CEMP provides a coordinated, systematic, and robust biodiversity monitoring program across all ecosystem types in the ACT, which can detect changes in ecosystem condition within the ACT, evaluate the effectiveness of management actions in achieving conservation outcomes, and provide evidence to support decision making

Key actions this period:

- CEMP Riparian and Aquatic Ecosystem Assessment and Monitoring Plan (CR)
- CEMP Bogs and Fens Ecosystem Assessment and Monitoring Plan (CR)
- CEMP Woodlands Ecosystem Assessment and Monitoring Plan (CR)
- Mulligans Flat monitoring framework (CR)

3.3 CEMP is mainstreamed across the Division, and its outputs are translated into strategic, statutory and operational planning

Key actions this period:

- CEMP outreach to other areas planned and implemented (CR)
- A performance evaluation framework designed and communicated, linking to CEMP's monitoring framework

3.4 Systems and tools that enable and support adaptive management are widely adopted, including online databases, apps and dashboards that facilitate data visualisation and use

Key actions this period:

- Spatialising operations dashboard (PCS)
- Generating a data driven spatial prioritisation and risk assessment tool to inform a "to do" list for priority conservation actions (PCS/Molonglo/CR)
- Evaluating effectiveness of adaptive kangaroo management in the ACT (CR/RL)
- Herbage Mass Decision Support Tool (PCS/CR)
- Sambar deer - evaluation of management effectiveness (CR/PCS)

4. THOUGHT LEADERSHIP

Goals

4.1 Processes and events held across ACT Government and beyond stimulate scientifically informed debate, creative exploration and the generation of management responses to high-impact emerging issues, including climate change adaptation.

Key actions this period:

- Mapping out process on climate change adaptation for ACT's environmental assets (CR/PCS)
- Agricultural adaptation and mitigation (nil tenure) (CWPP)
- Work on biosecurity risk under future climates (CWPP)
- Work on drought resilience planning and policy (CWPP)
- Fire science review planned (CR/FFR)
- Ecosystem Accounting/Services (Urban case study) (CWPP/CR)
- Webinar series on important issues of broad relevance (CR)

5. DATA CUSTODIANSHIP AND CURATION

Goals

5.1 Data governance processes and culture that foster the importance of data curation, accessibility and transparency established in the Division

Key actions this period:

- Establishment of Data Governance and Management Taskforce
- Incorporation of prompts on data storage and management included in front end of Science Directory

5.2 Innovation and best practice technology for capture, processing and storage of data, collaboration, and interactive visualisation and investigation of results are widely adopted

Key actions this period:

- Innovative tech adopted for deer project image data processing (CR)
- Options for AI/machine learning processing of image data being explored (CR/PCS)
- GIS Technical Working Group (PCS)
- Development of products from LiDAR data for Living Infrastructure Plan, Mature Native Trees Action Plan, etc (CWPP)
- Using LiDAR to investigate the relationship between elevated fuel density and time since fire in Namadgi (CWPP)
- Land capability mapping for agriculture and food production (CWPP)

5.3 Workflows that address full adaptive management cycles and strategic objectives beyond data capture and storage are adopted; such as streamlined analysis and data-driven visualisation portals to inform decision-making, policy, and review of management actions

Key actions this period:

- Rabbit management app and dashboard (CR/PCS)

5.4 Data generated by the Division is accessible and catalogued, for government, research institutions and the public, in line with the ACT's Open Data Policy

Key actions this period:

- Geospatial ecosystem (ACT Government)
- Biodiversity data repository (CWPP/CR/Commonwealth)

5.5 The use of knowledge-bases to capture and reuse research findings is actively explored

5.6 Management knowledge is imported into models that are used to support decision-making by EPSDD/others.

Key actions this period:

- Herbage Mass Decision Support Tool (PCS/CR).

PART TWO: Research and Monitoring Themes

All the projects currently underway against each Research and Monitoring Theme are listed here, noting there is significant overlap between themes and that some projects have been listed under multiple Research and Monitoring Themes.

1. Climate change

Strategic Objective: Updated climate change projections are available for the ACT, through the NSW and ACT Regional Climate Modelling (NARCliM) Project partnership, with clearly understood implications; frameworks available to assess and manage risks; and government, industry and the community are supported in assessing policy and management options to mitigate and adapt.

Knowledge needs and gaps

- Revised climate projections for the Territory
- Understanding of impacts on natural and built environments at a management scale
- Climate adaptation pathways for urban and rural societal sectors
- Identification and prediction of changes in: » ecosystem function, resilience, and ecosystem service provision » fire regimes » distribution and threat status of species and communities » the invasiveness of plant and animals » ecosystem processor species (e.g. pollinators, soil disturbers and decomposers) » soils, including soil carbon » the resilience of species and communities to climate change
- Identification of climate refugia and climate connectivity
- Re-conceptualised conservation goals and prioritised conservation actions in a rapidly changing climate

Project list

- Climate change adaptation for threatened species - pilot project with the University of Queensland (CR/CWPP)
- Urban Habitat and Connectivity Mapping (will incorporate climate change considerations)
- Ecological restoration through carbon accreditation (PCS)
- Using NARCliM data to inform future grass growth in the ACT (CR)
- *Eucalyptus blakelyi* provenance trials examining variation in dieback resistance (NRM)

2. Ecosystem processes and resilience

Strategic objective: Improved understanding of ecosystem processes that drive ecological change and identification of opportunities to build and maintain resilience.

Knowledge needs and gaps

- Characterisation of appropriate fire and water flow regimes to meet terrestrial and aquatic management goals
- Effective approaches for restoring connectivity in rural and urban environments for improving resilience
- Effective approaches for catchment and local-scale restoration for improvement in water quality and quantity and aquatic ecosystem condition
- Understanding of soil processes and the impacts of their disruption.

Project list

- ACT Hydrometric Network (Healthy Waterways (HW))
- AUSRIVAS monitoring (HW)

- Effectiveness of leaky weirs to promote post-fire recovery in upland bogs (CR)
- Effectiveness of shade cloth at increasing survival and growth of Sphagnum moss in bogs post-fire (CR)
- Effects of soil chemistry within Canberra Nature Park (PCS/CR)
- Herbage mass assessments (PCS/CR)
- Herbage Mass Decision Support Tool (PCS/CR)
- Mass balance of street tree leaves to inform water quality improvement activities (Healthy Waterways)
- Offsets soil phosphorus monitoring (5cm and 10cm samples)
- Reducing the impacts of Sambar Deer in the ACT's Ramsar site – the Ginini Flats Wetland Complex (CR)
- Using NARCliM data to inform future grass growth in the ACT (CR)
- Invertebrate, floristic, reptile response to habitat rock supplementation (PCS Offsets)
- Habitat connectivity for PTWL (PCS Offsets)
- Urban habitat and connectivity: Using expert elicitation to inform ecological requirements in the ACT (CR and partners)
- Waterwatch Catchment Health Indicators Program (HW)
- Cotter River environmental flows monitoring (CR)
- Lakes and Rivers Water Quality Program (HW)

3. Species and community ecology

Strategic objective: Innovative research to improve the understanding of the genetics and ecology of high-priority species and ecological communities, as a basis for informing and evaluating management and policy.

Knowledge needs and gaps

- Distribution, abundance and conservation status of ecological communities and species (including invertebrates)
- Fundamental ecological dynamics and processes of high-priority species and communities to inform adaptive management
- Understanding of how current management practices affect priority species and communities
- Identification of interventions that promote ecosystem resilience and generate broad biodiversity benefits
- Identification and exploration of captive breeding, genetic management, and reintroduction techniques to safeguard genetic diversity, promote threatened species conservation, and restore lost species from the landscape
- Identification of effective land, aquatic, and ecological community restoration techniques.

Project list

- ACT Superb Parrot Monitoring Program (Offsets)
- Platypus project (NRM/CR/University of Canberra (UC))
- Mulligans Flat managing fenced sanctuaries plus woodland restoration and reintroductions (ANU-led/CR)
- Mulligans Flat Woodland Sanctuary Monitoring Framework and Implementation Plan (CR)
- Golden sun moth male and female spatial and temporal relationships in the ACT (Offsets)
- Offsets Floristics monitoring (1x1m plots) (Offsets)
- Offsets vegetation structure monitoring (1x1m plots)

- Offsets vegetation structure monitoring (step point)
- Offsets weed density (fixed point)
- Offsets woodland bird monitoring (10 min fixed point)
- Offsets woodland bird monitoring (transects)
- Offsets Floristics monitoring (20m plots) (Offsets)
- Offsets photo point monitoring (fixed point)
- Offsets Golden Sun Moth habitat monitoring (Offsets)
- Offsets Golden Sun Moth population monitoring (fixed point) (Offsets)
- Offsets Golden Sun Moth population monitoring (transect) (Offsets)
- Offsets Grassland Earless Dragon conservation dog surveys (20x20m plots) (Offsets)
- Offsets Grassland Earless Dragon habitat monitoring (1x1m vegetation structure) (Offsets)
- Offsets Grassland Earless Dragon population monitoring (20x20m plot active searches) (Offsets)
- Offsets Grassland Earless Dragon population monitoring (artificial tubes) (Offsets)
- Offsets natural burrow addition monitoring (habitat creation) (Offsets)
- Offsets natural burrow monitoring (permanent transects) (Offsets)
- Offsets Striped Legless Lizard habitat monitoring (Offsets)
- Offsets Striped Legless Lizard population monitoring (Offsets)
- Small mammal/predator baseline survey - Molonglo/Stromlo (Offsets/CR)
- Development of a low-impact monitoring method for PTWL (Molonglo)
- Molonglo veg condition monitoring program (Molonglo)
- Movements of Little Eagles in the ACT (Little Eagle Research Group (CR))
- Mt Ainslie Rosenberg's Goanna monitoring (camera traps) (PCS)
- Montane crayfish fire recovery and genetic health (CR)
- Impact of prescribed burns on glider populations in NNP (CR/ANU)
- Eastern Long-necked Turtle populations in urban and peri-urban wetlands (Ginninderra Catchment Group)
- Dingo movements and ecology (CR)
- Murrumbidgee fish monitoring (CR)
- Trialling soft release methods for establishment of threatened species - smoky mouse (CR)
- Trialling new approaches to mitigating threats and re-establishing self-sustaining populations of Northern Corroboree Frogs (CR/PCS (Tidbinbilla)/ANU)
- Restoration of small mammal populations in CNP (proposal) (CR/PCS)
- Genetic rescue of Macquarie Perch (CR)
- PTWL translocation trial (Offsets)

4. Threats

Strategic objective: Improved understanding of key current and future threats (beyond climate change) to the ACT's environment, agriculture and liveability, in order to inform effective management responses.

Knowledge needs and gaps

- Increased understanding of bushfire impacts and the effectiveness of interventions for post-fire recovery
- Increased understanding of impacts of climate change-related changes in bushfire on ecological values, including identification of key fire refugia under likely climate scenarios
- Improved capability to predict and respond to plant invasion pathways
- Effective invasive plant management practices to improve environmental, economic and social values

- Innovative and cost-effective native and introduced herbivore management techniques to protect environmental, economic and social values
- Improved understanding of the ecosystem impacts of invasive predators and other animals, to inform appropriate management actions
- Improved awareness of development-related threatening processes (e.g. environmental contamination, habitat loss and fragmentation)
- Improved understanding of the impacts of specific human behaviours on ecological systems
- Assessment of economic impost of 'on farm' environmental threat management and implications for broader biodiversity values.

Project list

- Blakely's Red Gum dieback project (Offsets/ANU)
- Snowgum Dieback project (ANU-led/CR)
- Investigating the role of soil chemistry in Eucalyptus dieback and implications for dieback management in the ACT (Offsets)
- Setting management targets for weeds management (RL/CR/UC)
- Wildfire and planned burning in subalpine woodlands of Namadgi National Park (CR)
- Fire-sensitive vegetation - assessing impacts of Orroral Valley fire (CR)
- Effectiveness of shade cloth at increasing survival and growth of Sphagnum moss in bogs post-fire (CR)
- Effectiveness of leaky weirs at increasing survival and growth of Sphagnum moss in bogs post-fire (CR)
- Assessing the role of vegetation in post-fire predator-prey dynamics (CR)
- Frog Persistence and Recovery in the ACT post the Orroral Valley fire 2020 (CR)
- Factors influencing kangaroo-vehicle collisions in the ACT (CR)
- Herbage mass assessments (CR)
- Effectiveness of hand and dart delivered GonaCon immunocontraceptive vaccine in three species of macropods (CR/CSIRO)
- Kangaroo and wallaby surveys (CR)
- Home range and habitat use of EGK in the ACT (forthcoming publication)(CR)
- Potential for using CPEs (1080 ejectors) for fox control in CNP, including impacts on domestic dogs (CR/RL)
- Assessing the impacts of Sambar Deer in upland woodlands (CR/PCS)
- Using eDNA to understand diet composition in fallow deer in ACT (CR)
- Determining population connectivity and dynamics in fallow deer, using genetic techniques (CR)
- Engineered Log Jam construction and effect on aquatic habitat quality for threatened and other fish (CR)
- EHN (Epizootic Haematopoietic Necrosis Virus) detection in urban waterways (CR)
- Off-target impacts of anticoagulant poisons on native wildlife (CR)
- Post-fire deployment of nest boxes and bat boxes and utilisation by target species (NRM/CR/ANU)

5. Urban sustainability and wellbeing

Strategic objective: Knowledge established to maintain or enhance biodiversity values across the urban setting and the interface with reserves, and clarify the contributions of nature/biodiversity to the wellbeing of Canberra's citizens.

Knowledge needs and gaps

- Identification of biodiversity hotspots in urban environments
- Establishment of an integrated, comprehensive and scientifically informed vision for Canberra's development that maintains or enhances conservation outcomes
- Understanding of design and planning features for homes, gardens, parks, waterways and suburbs that increase wildlife benefit through the provision of habitat or connectivity
- Improved understanding of the extent and impacts of urban intensification, urban sprawl and urban infrastructure on biodiversity and human-wildlife conflicts, and the efficacy of approaches in reducing impacts
- Enhanced understanding of the relationship between nature conservation and community wellbeing, and how conservation contributes to achievement of the ACT's wellbeing targets
- Cost/benefit analyses of achieving biodiversity sensitive urban design
- Understanding patterns, trends, motivations for and experiences of park visitation; and identifying acceptable levels of ecosystem change due to visitor impact.
- Understanding the barriers to and benefits of changing specific human behaviours from the perspective of relevant social groups
- Understanding the efficacy and cost-effectiveness of specific behaviour-change interventions

Project list

- Urban Habitat and Connectivity project (CR and partners)
- Understanding Enterococci risk in public waterways (HW)
- Urban Lakes stocked-fish monitoring (CR)

6. Rural lands

Strategic objective: Improved understanding of approaches to support ACT Rural Landholders to be productive and environmentally sustainable.

Knowledge gaps and needs

- Improved knowledge on systems of sustainable agriculture, grazing and livestock management; niche/alternative industries and certification; and integrated pest management
- Approaches for maintenance and enhancement of on-farm biodiversity, soil health, water quality/ supply
- Social and economic research on factors affecting landholders' engagement in sustainable production activities
- Knowledge to support on-farm climate mitigation and adaptation.

Project list

- Protecting and connecting endangered woodlands in the ACT (NRM)
- Establishing drought refuges on ACT farms through improved riparian management and farm dam restoration (NRM)
- Farming Forecaster (NRM)

- Using NARCliM data to inform future grass growth in the ACT (CR)
- Do only a few dingos eat sheep? (possible proposal) (CR)

7. Fire management

Strategic objectives: Knowledge and evidence base generated to guide fire management practices that balance the need to protect human life and property with other land management objectives, particularly conservation of environmental and heritage values, in a changing climate.

Knowledge needs and gaps

- Improved capability to predict fire behaviour to reduce risks to human life, property and ecological values
- Improved understanding of post-fire water quality risks
- Improved understanding of the effects of fire suppressant chemicals on biodiversity and how best to apply them during fire management actions to minimise risks
- Increased understanding of ecological impacts of prescribed burning regimes to inform fire management programs
- Spatial modelling capability for exploring strategic fuel management options that optimise bushfire risk and environmental outcomes
- Greater understanding of long-term fuel dynamics of ACT ecosystems in response to prescribed burning
- Greater understanding of aspirations of Ngunnawal peoples regarding burning as a management tool, including incorporation of cultural knowledge and techniques

Project list

- Ecological effects of fire fighting chemicals on aquatic ecosystems (CR/UC)
- Impact of fire regimes in subalpine woodlands on bushfire recovery (CR)
- Post-fire monitoring of birds in Namadgi wet sclerophyll forests (CR)
- Effects of prescribed burning - Black Mountain (final analysis/publication) (CR)
- Ecological impacts of, and recovery after, prescribed burn "escapes": Potters Hill and Cotter River (depending on initial review of sites)(CR)
- Spatial modelling of trade-offs around using prescribed burning to protect ecological assets from bushfire impacts (CR)

8. Water

Strategic objectives: Knowledge and evidence developed to support the maintenance of water quality and quantity into a warmer and drier future.

Knowledge needs and gaps

- Projected scenarios for water flows and impacts on water bodies in the ACT
- Water quality dynamics within the ACT waterways, including nutrient movements in urban ponds, wetlands and lakes
- Possible management interventions in these waterways (e.g. transformation of current water bodies to wetlands; restrictions on chemical fertilisers; mandatory pre-treatment zones for stormwater runoff as part of development applications) and their efficacy at achieving objectives
- Improved understanding of the impacts of specific human behaviours on water quality and the efficacy and cost effectiveness of possible behaviour-change interventions
- Understanding of the effectiveness of the ACT's environmental flow guidelines and potential improvements, including with respect to needs of aquatic species and communities

- Understanding interactions between terrestrial land management practices (e.g. total grazing pressure), soil processes, and water management
- Assessment of the requirements for environmental flows from upstream of the ACT e.g. Tantangara releases to the Upper Murrumbidgee River, including proposed changes under the Snowy licence and Snowy Hydro 2.0 → Emerging technologies to reduce pollutant load
- Regional approaches to catchment management/ research.

Project list

- Macrophytes of the ACT (CR)
- Incorporating genetics in threatened fish management (CR)
- ACT Hydrometric Network (Healthy Waterways)
- AUSRIVAS monitoring (Healthy Waterways)
- Lakes and Rivers Water Quality Program (Healthy Waterways)
- Mass balance of street tree leaves to inform water quality improvement activities (Healthy Waterways) Understanding Enterococci risk in public waterways (Healthy Waterways)
- Waterwatch (NRM

9. Soils

Strategic objectives: Knowledge and evidence developed to maintain and improve soil quality into a warmer and drier future through management interventions.

Knowledge needs and gaps

- Projections on soil quality, soil moisture, hydrology, erosion and nutrient cycling under a warming and drying climate, and implications for agricultural productivity and ecosystem functioning
- Better understanding of how soil condition on rural lands, and its response to drought, compares to soils on conservation estate
- Knowledge on soil biodiversity across the landscape
- Understanding of the areas and soil types that can benefit the most from conservation and management interventions
- Improved understanding of most effective management interventions to preserve and improve soil quality and productivity, including under hotter and drier conditions
- Improved understanding of management practices to prevent or restore areas of significant soil erosion, nutrification, or contamination

Project list

- ACT NRM's Better Land Management Project (2018-2023) (NRM/NSW DPI)
- Carbon trial on an ACT farm – testing a range of soil additives to improve soil carbon, in Autumn 2021 (NRM/ NSW DPI)
- Farming Forecaster (NRM)
- Effects of soil chemistry within Canberra Nature Park (CR)
- Investigating the role of soil chemistry in Eucalyptus dieback and implications for dieback management in the ACT (Offsets)
- Offsets soil phosphorus monitoring (5cm and 10cm samples)

10. Plantations, carbon and biodiversity management

Strategic objective: Knowledge base established for effective carbon capture in the landscape, particularly through plantations, and managing plantations to enhance biodiversity values.

Knowledge needs and gaps

- Exploration of impact of management approaches, such as native vegetation corridors, on biodiversity in and around pine plantations
- Understanding of effective approaches for carbon capture in ACT context
- Identification of future planting requirements and determination of offset capacity
- Investigation of means to align reforestation for carbon offsets and biodiversity conservation objectives
- Development of new forms of carbon sequestration for submission to the Clean Energy Regulator for consideration for funding

Project list

- Ecological restoration through carbon accreditation (PCS)
- Carbon trial (see above; NRM/NSW DPI)

11. Ecosystem services and environmental accounting

Strategic objectives: The economic contribution of ecosystem services to the ACT is better understood, including to guide investment in the protection and management of ecosystem services, and the utility and appropriate use of environmental accounting in the ACT context is assessed.

Knowledge needs and gaps

- Water: understanding of what savings are made by ensuring water quality at source is high compared to the cost of treating water after extraction
- Forests and woodlands (including urban forests): Assessment of the contribution of forests and woodlands to the liveability of Canberra (e.g. air quality, moderation of temperature). Establishment of method to provide a monetary value (and cost benefit analysis) to benefits provided by trees across their lifetime. Understanding of whether retention of mature trees and urban open space improves the value of adjacent blocks. Understanding of how the economic and social benefits of ACT pine plantations balance with their impact on ecosystem services (e.g. water yield and quality)
- Health, wellbeing and amenity: Knowledge on the benefits provided by reserves to the community (health, wellbeing and/or amenity), and why
- Environmental accounting: Appropriate valuation methods for biodiversity and conservation in the ACT and understanding on how they can inform EPSDD decision making. Assessment of how much members of the ACT community are willing to pay for conservation

Project list

- Ecological restoration through carbon accreditation (PCS)