
Department of Planning, Housing and Infrastructure

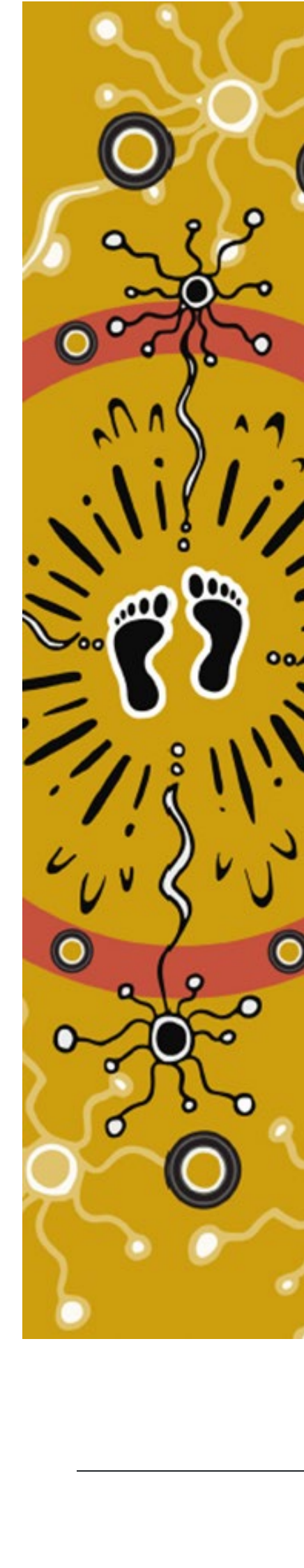
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Research strategy for the Cumberland Plain Conservation Plan

May 2025





Acknowledgement of Country

This strategy acknowledges more than 60,000 years of continuous Aboriginal¹ connections to the land that makes up NSW. We acknowledge and pay our respects to Elders past and present.

This strategy recognises that, as part of the world's oldest living culture, traditional Aboriginal owners and custodians share a unique bond to Country and the plants, animals, waterways and landforms it contains. This relationship has been forged through thousands of years of living with the lands and waters and engaging with them for ceremony, religion, trading and seasonal migration.

The area covered by the Cumberland Plain Conservation Plan (Figure 4) has been traditionally cared for by 3 Aboriginal groups: the Darug, Dharawal and Gundungurra. Others, such as the Eora, Darkinjung, Wiradjuri and Yuin may also maintain trade or other obligatory care relationships with the area. The Deerubbin, Gandangara and Tharawal local Aboriginal land councils also have local land holdings and contemporary responsibilities towards all the Aboriginal peoples and communities living in the area. This strategy recognises that there are many Aboriginal and Torres Strait Islander peoples today who are connected to Country that is now largely known as the Cumberland Plain.

This strategy recognises the need to integrate Aboriginal knowledge, practices and perspectives into conservation approaches, and seeks the active leadership, participation and engagement of Aboriginal groups and practitioners.

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Research strategy for the Cumberland Plain Conservation Plan

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¹ The term 'Aboriginal' is used in this strategy to recognise those who identify as Aboriginal Australian peoples (and are recognised by their communities as such) with traditional and/or contemporary connections to the lands now known as the Cumberland Plain. We recognise that labels such as Aboriginal fail to recognise the vast diversity of nation, language, clan and tribal groups now understood to be Aboriginal and/or Torres Strait Islander peoples. Please see [Practice resource – Working with Aboriginal people and communities \(PDF 1.16 MB\)](#) for more detail.

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Executive summary

The vision of this strategy is to guide the research needed for effective delivery of the Cumberland Plain Conservation Plan to 2056.

The strategy was developed after targeted consultation with stakeholders and research partners, and from targeted public consultation on the draft strategy. The strategy recognises that local Aboriginal knowledge and collaboration must be an integral part of the research program.

The research program guided by this strategy aims to fill critical knowledge gaps to help those working to conserve the plants and animals of the Cumberland Plain.

The Cumberland Plain Conservation Plan (CPCP) aims to maintain and restore the variety of animal and plant life in the Cumberland Plain over the long term (to 2056) as the region grows. A key part of the CPCP is to create an ongoing research program.

This research strategy was developed by a team from Western Sydney University (WSU) and the NSW Department of Planning, Housing and Infrastructure (the department). Its purpose is to guide the research needed to carry out the CPCP. We talked with a wide range of local stakeholders and land managers to find out what research was needed to improve conservation and restoration efforts.

The strategy recognises that Aboriginal knowledge of land management, landscape features and cultural practices in the Cumberland Plain is critical for the success of the CPCP and will be an important part of the research program.

The strategy covers the long-term time frame of the CPCP but also prioritises research for stage 1 - the initial 4 years of funding (see Figure 1). It provides a framework for collaborative research between disciplines and applied research.

The strategy's research priorities have 4 themes:

- supporting Aboriginal connections
- engaging with peoples and cultures
- conserving threatened species and ecosystems
- restoring and reconstructing ecosystems.

The strategy calls for research findings to be used in the restoration and conservation work as they emerge. The team will then assess the effectiveness of the new actions in a process of continuous improvement.

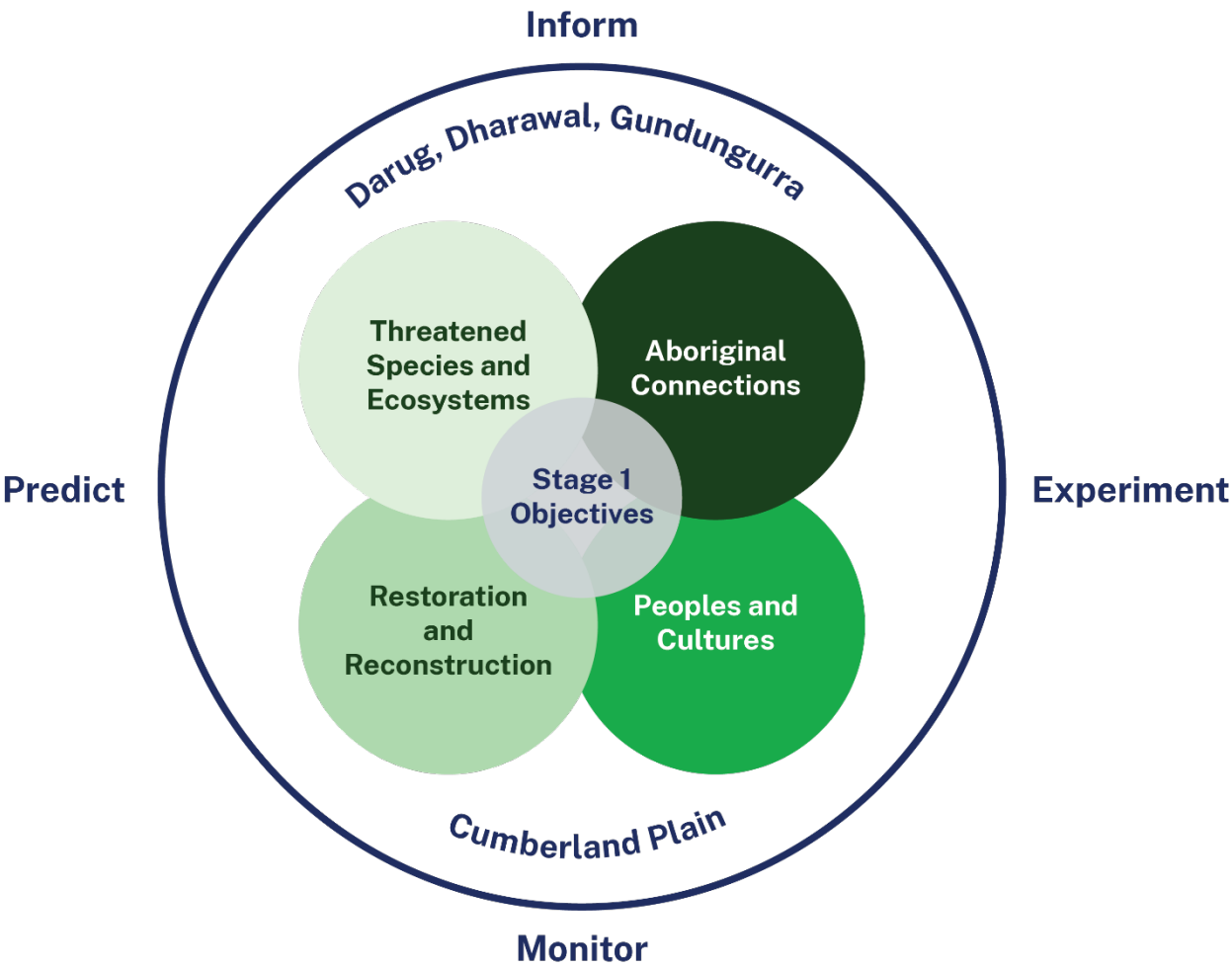


Figure 1. Stage 1 of the research program will be influenced by 4 themes

1 About this strategy

The vision of this strategy is to guide the research needed for effective delivery of the CPCP. The strategy will help determine the resources needed for the research and identify priorities for the initial 4-year, \$1.8 million research program (stage 1). The research will inform the conservation and restoration of threatened species and ecosystems in the Cumberland Plain. The strategy will also support Aboriginal people's connection to Country.

1.1 The Cumberland Plain Conservation Plan

The CPCP will support conservation and protect the variety of animal and plant life (biodiversity) in the Cumberland Plain over the long term. The region is predicted to grow from 1,056,120 people in 2016 to more than 1.5 million by 2056. The CPCP identifies important biodiversity areas within the Cumberland Plain that can be used to offset the impacts future urban development will have on biodiversity.

The CPCP comprises of 3 documents to ensure the success of the strategic conservation planning for Western Sydney – the overarching CPCP document and 2 other documents known as the Sub-Plans. 'Sub-Plan A: Conservation Program and Implementation' supports the CPCP by providing the framework for implementing the CPCP's conservation program and includes details of the commitments and actions needed to realise the CPCP's vision while 'Sub-Plan B: Koalas' describes how the CPCP will protect koala populations in Western Sydney. The conservation program within Sub-Plan A commits to investing in research for the CPCP. When we refer to the CPCP in this strategy, we include Sub-Plan A.

1.2 Why is research needed?

There are hundreds of native species and ecosystems in the Cumberland Plain. They include 49 threatened species and 8 threatened ecological communities (see 'Appendix: Threatened species and ecological communities in the Cumberland Plain') that will likely be impacted by future development in the region. These native species and ecosystems are already under pressure from threats such as climate change, invasive plants and animals, and habitat fragmentation and loss.

There are still many gaps in our knowledge of these species and ecosystems and about the best ways to conserve and restore them.

A key action of the CPCP is to undertake research where needed to carry out the CPCP's commitments. The NSW Government gave \$1.8 million to WSU to develop this research strategy and carry out stage 1 (the first 4 years) of the research program.

1.3 Strategy aims

This strategy will guide research investment and priorities to effectively carry out the actions outlined in the CPCP. Figure 3 describes how the strategy will achieve this.

The strategy will run for the life of the CPCP (to 2056) and identifies research priorities for stage 1 of the research program. A steering committee appointed by the department will oversee how the strategy is carried out. The strategy can change and will be reviewed, evaluated and updated at 5-yearly intervals as part of the CPCP's independent external review process.

By guiding what research is undertaken, the strategy will ensure the results will:

- help to expand knowledge about the area's threatened species and ecosystems and our ability to manage, restore and monitor plant, animal and ecosystem responses to our efforts
- provide the data and new knowledge needed by the different stakeholders working to conserve and restore the native plants and animals of the Cumberland Plain.

The research and its findings will be shared with relevant programs for mutual benefit wherever practical. For example, research on koala feed trees would be relevant to the [NSW Koala Strategy](#) and threatened species research would be relevant to the [Saving our Species program](#).

1.4 Strategy themes

The research priorities follow 4 themes (see Figure 1):

- **supporting Aboriginal connections** – partnering with Aboriginal peoples on research to help maintain their cultural, spiritual, physical and economic relationships with their lands and waters in the Cumberland Plain
- **engaging with peoples and cultures** – understanding the attitudes and behaviours of the community towards biodiversity and conservation values found in the Cumberland Plain and how these can be positively influenced

- **conserving threatened species and ecosystems** – understanding the ecology, habitat needs, geographic distribution and genetic diversity of species and ecological communities and their likely responses to changing land use and climate
- **restoring and reconstructing ecosystems** – understanding how to successfully restore degraded ecosystems and re-build functional ecosystems to improve conservation areas in the Cumberland Plain.

This strategy also focuses on understanding and managing the impacts of climate change on biodiversity values, which is relevant to all the research themes, especially 3 and 4.



Figure 2. WSU's EucFACE climate change experiment in the Cumberland Plain Woodlands. Photo: Paul Rymer

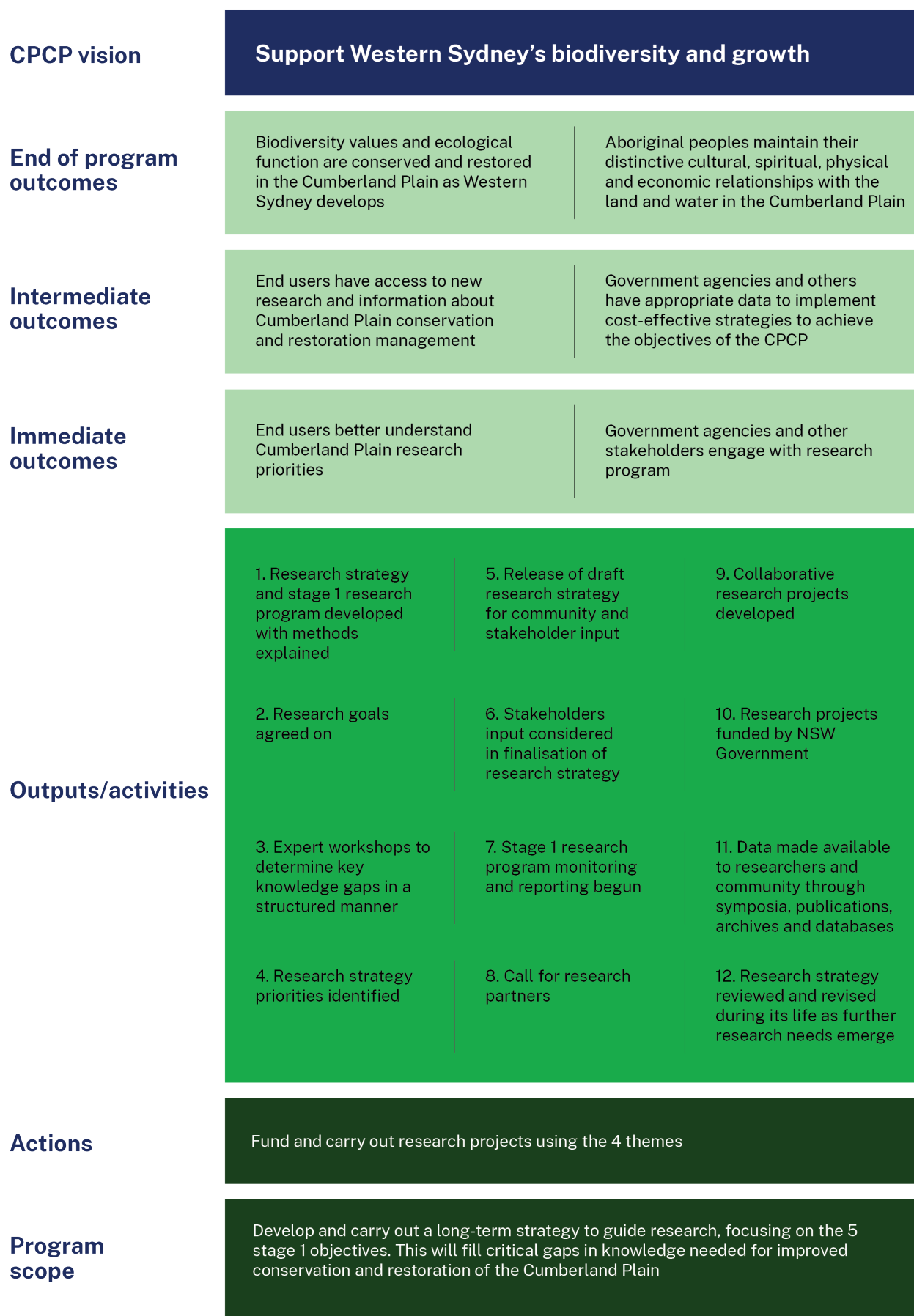


Figure 3. Program logic to carry out the CPCP research strategy and achieve the CPCP's vision

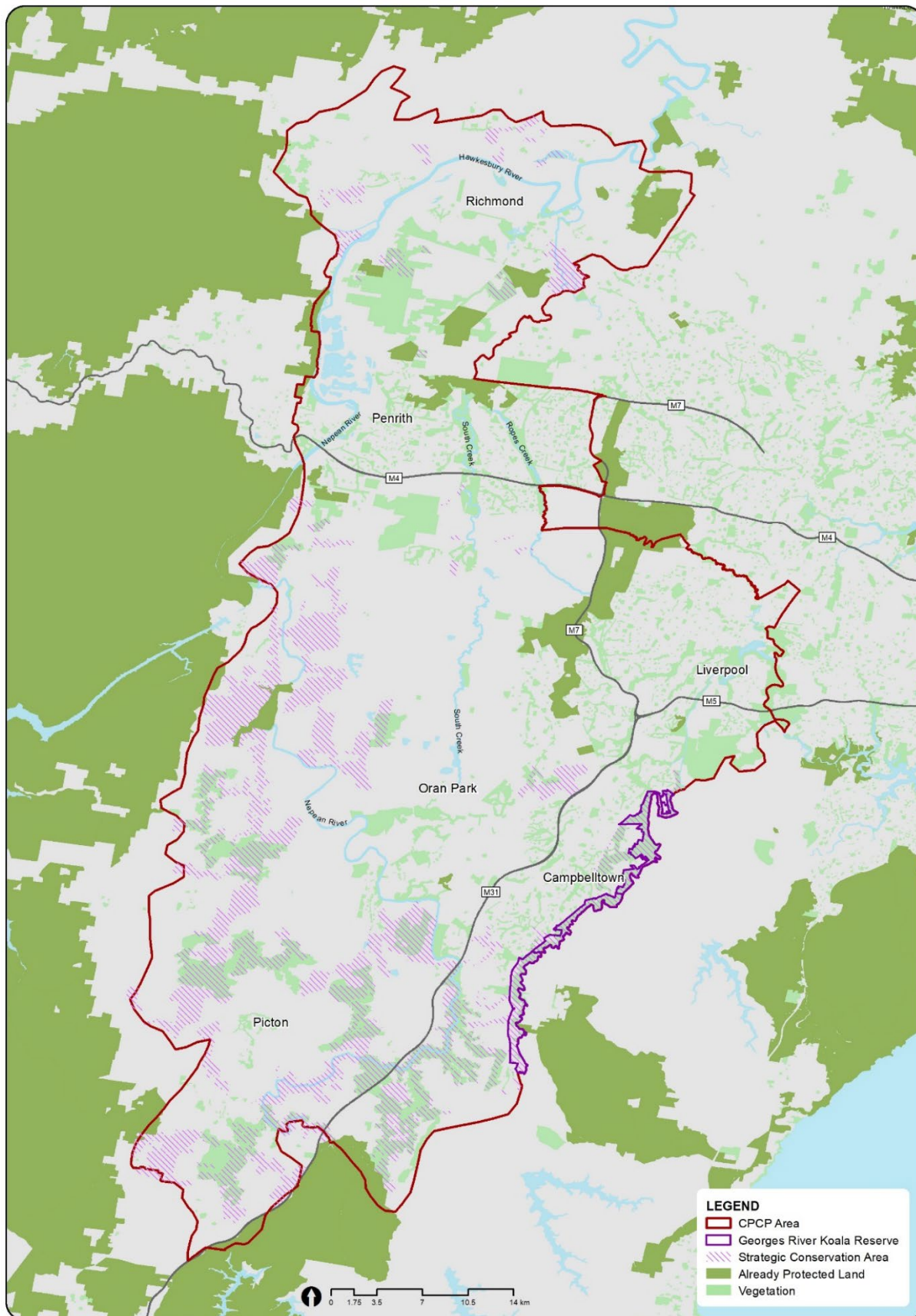


Figure 4. Map of the Cumberland Plain showing existing native vegetation and strategic conservation area

2 Integration of Aboriginal knowledge and perspectives

The Cumberland Plain is the Country of the Darug, Dharawal and Gundungurra peoples. However Aboriginal and Torres Strait Islander peoples from many other groups also live in or have care relationships with the area.

This strategy recognises the need to undertake research to support Aboriginal peoples in maintaining their cultural, spiritual, physical and economic relationships with the lands and waters in the Cumberland Plain.

Aboriginal knowledge of land management, landscape features and cultural practices in the Cumberland Plain is important to the success of the CPCP. Aboriginal knowledge and practices will be integrated into the way research is done.

2.1 The importance of Aboriginal peoples to the Cumberland Plain

More Aboriginal people live in Western Sydney than anywhere else in Australia, with many families originating from homelands in wider NSW and throughout Australia. We recognise that engaging and partnering with Western Sydney's diverse Aboriginal communities is an important part of carrying out the CPCP.

One of the CPCP's aims is to support participation by Aboriginal peoples, promote Aboriginal knowledge and help Aboriginal communities maintain their relationships with land and waters in Western Sydney. To achieve this, the department is developing a 10-year 'Caring for Country Aboriginal Outcomes Strategy 2023–2033' (the Caring for Country Strategy) with Western Sydney's Aboriginal communities.

Research priorities in the 'Supporting Aboriginal connections' theme (see section 3.1) will support the actions in the Caring for Country strategy and the outcomes for Aboriginal peoples described in the CPCP.

2.2 Strategy co-working commitments

The research program will work with Western Sydney's Aboriginal communities using the following principles:

- respect Aboriginal connections and sovereignties of the Countries in the area identified as the Cumberland Plain
- ensure research that concerns or impacts Aboriginal peoples, their knowledge, lands or waters, including native plants and animals, is led or co-developed by Aboriginal peoples
- use Aboriginal knowledge and western science together to provide new opportunities to more effectively care for Country
- ensure Aboriginal peoples maintain control over when, how and why Aboriginal ecological knowledge and data may be gathered, analysed, accessed and used (as per guidelines from the Australian Institute of Aboriginal and Torres Strait Islander Studies and the NSW Government's Aboriginal Cultural and Intellectual Property Protocol)
- ensure that findings which strengthen connections to Country with Aboriginal knowledge and practices are shared with Aboriginal Custodians and the Aboriginal communities they came from. This includes findings from other sources (e.g. workshops, community grants) to ensure the benefits are available to future generations of Aboriginal communities
- locally co-develop Aboriginal research methods, ethics and protocols
- build partnerships based on mutual respect and promote a culturally safe environment
- communicate effectively to keep the broader community informed of research, support equitable access to opportunities and translate findings back to communities
- appoint an Aboriginal researcher to oversee theme 1 research (supporting Aboriginal connections) and provide guidance to project teams that work with Aboriginal partners in other themes
- appoint an Aboriginal theme leader to work closely with Aboriginal and non-Aboriginal researchers to promote more opportunities to work with Aboriginal Custodians and stakeholders and the use of Aboriginal knowledge and caring for Country practices across the research program
- ensure theme 1 research benefits Aboriginal communities and Country.



Figure 5. Aboriginal connection to Country - Aunty Fran Bodkin on Dharawal Country (the Australian Botanic Garden Mount Annan). Photo: Paul Rymer

3 Research strategy

Research priorities are determined by knowledge gaps and organised in 4 themes. Understanding and managing the impacts of climate change on species and places is an important focus, particularly in themes 3 and 4 within the strategy.

To find out how the strategy was developed, see the 'Research strategy for the CPCP: What we heard' report. It includes how consultation and research priorities were set to meet the objectives of the CPCP.



Figure 6. *Indigofera australis* (Australian indigo) is called duwabili in Dharawal language. Photo: Paul Rymer

3.1 Theme 1: Supporting Aboriginal connections

Theme 1 will deliver research to help Aboriginal peoples maintain their cultural, spiritual, physical and economic relationships with the land and waters in the Cumberland Plain (see Table 1).

Aboriginal researchers will lead the development of the research methods in theme 1, working with Aboriginal stakeholders. The research will provide new knowledge and tools to help carry out both the CPCP and the Caring for Country Strategy.

Table 1: Theme 1 research priorities

Subtheme	Knowledge gap/questions to be answered
1.1 Improved management of culturally significant species and places	• What sites, places and species are culturally important to Aboriginal Custodians and Aboriginal groups in the Cumberland Plain? How can these be mapped or better understood? • How can Aboriginal Custodians lead and be involved in the management of culturally significant sites, places and species? • How do we embed Aboriginal knowledge and practices into conservation policy and land management in Western Sydney?
1.2 Maintaining and providing for Country	• How can Aboriginal fire and land management practices improve current policies and practices to protect biodiversity and minimise risk to assets and lives? • What is stopping Aboriginal peoples from accessing employment and training pathways in the environmental sector and growing businesses and organisations that provide environmental services? • What role can Aboriginal Custodians and Aboriginal groups play in managing cultural resources such as bush food and medicine to support the cultural ecosystem and personal use of different species? • How can Aboriginal-led tourism support conservation and economic outcomes in the Cumberland Plain? • How can caring for Country improve the mental and physical health of Aboriginal peoples and their ability to pass on knowledge?
1.3 Revive language and culture	• How can Aboriginal languages be revived to support outcomes? • How do songlines, stories, and Aboriginal trade trails relate to important connectivity values in the Cumberland Plain and how can these inform connections in the landscape and natural ecosystem?
1.4 Cultural waterways management	• Understand cultural water sites and the hydrogeology (study of groundwater) of the Cumberland Plain from an Aboriginal perspective. • How can Aboriginal Custodians and other Aboriginal groups' knowledge and experiences inform the management of waterways, riverbank and wetland areas in the Cumberland Plain?

3.2 Theme 2: Engaging with peoples and cultures

Theme 2 will drive research to understand and positively change the attitudes and behaviours of the community towards biodiversity and conservation values found in the Cumberland Plain (see Table 2).

Table 2: Theme 2 research priorities

Subtheme	Knowledge gap/questions to be answered
2.1 Values	• We don't know how stakeholders (such as residents, landowners, Aboriginal groups and conservation practitioners) value biodiversity and conservation • Does the community value biodiversity offset sites on private land differently to publicly accessible conservation reserves?
2.2 Changing attitudes through engagement	• How can the values of the community in Western Sydney be shaped over time to respect and appreciate native plants, animals and ecological communities? • How can the community be involved in monitoring conservation outcomes, to heighten community appreciation and ensure knowledge gained in the process is used for successful management and conservation over the long term? • What is the role of storytelling and the media in changing community values over time and how can this be used and improved upon?
2.3 Land use conflict	• How can landowners be encouraged to participate in conservation, restoration and caring for Country? • What are the main areas of conflict between public use of conservation areas and managing these areas for conservation and restoration? • In what ways are state and local governments and community groups responsible for carrying out the actions of the CPCP and how does the current model compare?

3.3 Theme 3: Conserving threatened species and ecosystems

Theme 3 will drive research into the conservation of threatened species and ecosystems. This will give us a better understanding of the ecology, habitat requirements, geographic distribution and genetic diversity of species and ecological communities and their likely responses to changing land use and climate (Table 3).

Table 3: Theme 3 research priorities

Subtheme	Knowledge gap/questions to be answered
3.1 Areas of importance	• What locations in the Cumberland Plain have high biological diversity at the community, species and genetic level which should be conserved or used as sources of species for restoration? • What locations and habitat features within the Cumberland Plain may act as climate/habitat refugia?
3.2 Population size and connectivity thresholds	• How can we improve connectivity to maintain geneflow and habitat extent and suitability in the Cumberland Plain?
3.3 Diversity and ecosystem function and resilience to stressors	• What is the importance of species and/or functional diversity for ecosystem resilience? • How will climate change affect ecosystem diversity, structure and function in the Cumberland Plain (including habitat and resources for native species)?
3.4 Vulnerability to climate change	• How do threats (including fragmentation, habitat degradation, altered fire patterns and climate change) interact? • How sensitive are threatened and dominant species to extreme weather events in threatened ecological communities in the Cumberland Plain?
3.5 Fire history and burning practices	• How do you manage fire in the Cumberland Plain to improve conservation outcomes and minimise risk to assets and lives? How can fire be re-introduced in remnant vegetation near populated areas in Western Sydney?

3.4 Theme 4: Restoring and reconstructing ecosystems

To increase the extent and value of conservation areas in the Cumberland Plain, theme 4 priorities will drive research to help restore degraded ecosystems and determine how to successfully reconstruct functional ecosystems (see Table 4). Theme 4 research will also work with restoration sector stakeholders, including local Aboriginal, community and industry groups, to develop and undertake the reconstruction and restoration required by the CPCP.

Table 4: Theme 4 research priorities

Subtheme	Knowledge gap/questions to be answered
4.1 Main barriers to success	• What are the main physical, chemical and biological barriers that limit soil restoration? • What management options could overcome these barriers in the near and longer term?
4.2 Cost-effective management options	• What actions could cost-effectively manage invasive or pest species? • What role does the seed bank play in bush regeneration and how do we assess when it is worthwhile to maintain it on site? • What is the role of the order in which species establish in restoration projects and how can we use it to work towards restoration goals?
4.3 Enhancing ecosystem function and resilience	• What level of diversity in plants, animals and microorganisms, from genetic to species level, above-ground and below-ground, is needed to increase an ecosystem's ability to adapt to future climate conditions?
4.4 Ensuring capacity	• How do we develop and secure the capacity of the restoration sector (including Aboriginal and community groups) to undertake the reconstruction and restoration required by the CPCP? It would need to include access to seed/propagule sources, facilities to grow material and the know-how to carry it out in practice • How can soil microbes be used to improve the production, establishment, growth and resilience of key plant species used in restoration?
4.5 Prioritising sites for restoration and reconstruction	• How do we prioritise where restoration is undertaken, considering ecological constraints, spatial position, connectivity (ability of species to disperse in the landscape), local ecological and broader societal/cultural goals, Aboriginal knowledge and cost-effectiveness of management options?

4 Stage 1 of the research program

The NSW Government has funded the first stage of this strategy. Stage 1 is a 4-year program that will undertake high-priority research to support stakeholders in the Cumberland Plain to carry out the actions in the CPCP.

Our first actions will be research into the most important knowledge gaps from the 4 themes in the strategy.

Stage 1 priorities are split into 5 objectives: strengthening Aboriginal knowledge and practices, prioritising sites for shared cultural, conservation and restoration values, enhancing the health and resilience of ecosystems, improving the management of climate change risks, and identifying cost-effective management practices to improve biodiversity.

Stage 1 research will also start on the long-term priorities of the strategy.

A focus of stage 1 is establishing research projects that bring together people with critical expertise and know-how. Specifically, programs and projects will be organised to enable researchers from different institutions to work with policymakers, conservation managers, restoration practitioners, Aboriginal groups and local communities. This will ensure high-quality research needed for the effective delivery of the CPCP.

4.1 Objective I: Strengthening Aboriginal knowledge and practices

Connection to Country for Aboriginal peoples is important for cultural, social and environmental reasons. Aboriginal practices have been developed over a long history of living with, managing and serving the land. It is critical to reconnect to the knowledge and practices belonging to Country through the revival of Aboriginal languages and songlines and increasing knowledge of and respect for Aboriginal practices by people being on the land.

High-priority activities include:

- interviews with Aboriginal peoples conducted according to the Aboriginal and Torres Strait Islander ethics and protocols (AIATSIS and NHMRC) to understand knowledge systems, language and songlines
- yarning, storytelling and similar Aboriginal-led approaches to highlight the importance of relatedness to species, places and Country
- examination of archival materials, genetic analysis of plants and animals and analysis of charcoal deposits to fill key knowledge gaps in Aboriginal practices, including trade and fire management
- cultural burns led by local Aboriginal groups undertaken to reconnect people to Country and monitored for cultural, social and environmental benefits
- trials of natural harvesting by local Aboriginal groups for cultural, social and environmental benefits, including seed collection for ecological restoration.

This objective drives research prioritised in strategy subthemes 1.1 to 1.4, 2.3, 3.1, 3.2 and 4.4 (see section 3).

4.2 Objective II: Prioritising sites for shared cultural, conservation and restoration values

Social and cultural research is needed to ensure that conservation and restoration work fits with the shared values of Aboriginal groups and the local community. Basic research is also needed on the distribution and extent of diversity within and surrounding the Cumberland Plain to determine where to begin conservation and restoration efforts. This will also allow us to benchmark habitats in good condition to inform restoration targets, guide actions and assess outcomes. It will also help prioritise sites to meet cultural and social needs as well as conservation and restoration goals.

High-priority activities include:

- conducting local community surveys and focus groups to understand how much the community appreciates the natural environment and unique plants and animals of the Cumberland Plain
- citizen science projects coupled with biological assessment surveys to explore and establish shared values for conservation and restoration
- conducting new flora and fauna surveys to complement existing records and fill critical gaps. This will include the physical, chemical and biological properties of soil needed for target species and ecosystems
- genetic analysis of target species to assess levels of genetic diversity within remnant populations and historic patterns of habitat connectivity across the landscape in the Cumberland Plain
- development of guidelines for the prioritisation of sites and species that consider ecological, social, cultural and economic values.

This objective delivers research prioritised in strategy subthemes 1.1, 1.4, 2.1 to 2.3, 3.1 to 3.3 and 4.5.

4.3 Objective III: Enhancing the health and resilience of ecosystems

Healthy ecosystems are more likely to be self-sustaining, resist global changes, need less human intervention and be more valued by the local community. The specific ways in which biological diversity creates healthy, functioning and resilient ecosystems are still not fully known. Research is needed to define and measure this to use the findings in conservation, restoration and land management work.

High-priority activities include:

- defining and quantifying factors that make healthy and self-sustaining remnant and restoration sites
- creating experimental plots controlling diversity and stressors to test diversity-function relationships and work out tolerance thresholds for the reconstruction of resilient natural ecosystems
- establishing a network of monitoring sites to benchmark reference ecosystems, measure change through time, assess climate impacts and evaluate conservation and restoration management practices
- modelling and simulation studies to test the numbers of species and functional groups needed to provide different ecosystem functions and levels of resilience to disturbance
- engaging the community and raising awareness of ecosystem diversity, function and resilience.

This objective delivers research prioritised in strategy subthemes 1.1, 1.2, 2.2, 2.3, 3.2, 3.3, 4.2 and 4.3.

4.4 Objective IV: Improving management of climate change risks

The vulnerability of species to climate change is determined by their innate sensitivity and exposure to changing conditions. This includes the frequency and intensity of extreme events such as floods, heatwaves and droughts. Information on threatened species' vulnerability to climate change is limited to climate-niche predictors (for example, maximum temperatures experienced across a species) and life-history predictors (for example, time to reproduction). There are still major gaps in our understanding of how climate change will impact species. Filling these gaps will help us create strategies to reduce the impact of climate change on biological communities and help species adapt and build resilience.

High-priority activities include:

- talking with local Aboriginal communities to find out what social and cultural impacts they have experienced from climate change, and understand how Aboriginal practices may improve climate-change resilience
- conducting field and laboratory studies of the tolerance of both threatened and dominant species in ecosystems to extreme weather events such as floods, heatwaves and droughts
- monitoring natural plant and animal populations to assess climate sensitivity across the landscape, and when possible moving to the use of remote sensing (such as satellite imaging), on-ground sensors and citizen science observations to enhance the monitoring efforts
- modelling to predict species and areas most vulnerable to climate change
- carrying out genetic analyses of natural populations of animals and plants across geographic and climate space to predict how well they might adapt to climate change.

This objective delivers research prioritised in strategy subthemes 1.1, 1.2, 2.2, 2.3, 3.3, 3.4, 4.2 and 4.5.

4.5 Objective V: Identifying cost-effective management practices to increase biodiversity

The effectiveness of current practices compared with their cost, including those associated with fire regimes, suppression of pests and restoration and reconstruction of degraded land, is not well

documented. Evaluating the effectiveness and cost of current and novel practices on private and public land is key to improving the management of the Cumberland Plain's biodiversity.

High-priority activities include:

- collecting and combining existing data and filling critical gaps through targeted field surveys on public and private land. This will allow us to assess the effects of current management practices and identify practices that need further field assessment
- conducting field and laboratory-based experiments to identify physical, chemical and biological barriers to successful restoration, and techniques to overcome them
- conducting field trials to assess current and other potential management practices (such as topsoil removal and cultural burns). This will allow us to identify cost-effective ways to manage weeds, pests and target plant species, to encourage ecosystem recovery
- evaluating the role of succession (the order that species establish) in conservation and restoration programs. This will help us decide whether to allow 'natural' succession or undertake improved succession through management, in restoration projects
- conducting a feasibility study to assess whether we can manage sites at the necessary scale and over the desired time period at a reasonable financial and social cost
- developing conservation and restoration guidelines for Aboriginal, community and industry stakeholders to support collection of propagules (i.e. seed and symbionts), propagation and establishment techniques along with approaches to document and monitor outcomes.

This objective delivers research prioritised in strategy subthemes 1.1, 1.2, 1.4, 2.2, 2.3, 3.3, 3.5 and 4.1 to 4.5.

4.6 Delivery of stage 1 projects

WSU was chosen through a competitive process to conduct the research for stage 1 of the program. The university has already called for expressions of interest from research partners in 2023 and will do so again in 2024 and as needed into the future. A priority of the program is establishing projects that enable researchers from different institutions to work with policymakers, conservation managers and restoration practitioners. This process will make use of existing programs and resources and allow certain projects to be undertaken by researchers from several key institutions.

The CPCP's Research Program Steering Committee must approve all projects in stage 1 of the research program. The steering committee includes people from the department and WSU (see section 5.1).

The steering committee will assess project proposals and consider whether they:

- are likely to cost-effectively deliver high-quality research promptly, to address key research priorities and deliver desired outcomes
- address knowledge gaps in multiple research themes and contribute to stage 1 objectives
- support effective delivery of CPCP commitments
- have multiple partners and foster meaningful working partnerships
- are Aboriginal led or co-led and/or engage and inform local Aboriginal stakeholders
- take advantage of extra co-funding, such as grants and partnerships
- effectively manage risks.

Notably, suggestions by respondents to the public consultation will be included in stage 1 research. The suggestions were from targeted stakeholders: government, non-government institutions, universities, industry, conservation groups, local community and Aboriginal groups. They are the subject of the strategy's 'What we heard' report, and include important knowledge gaps, research activities and projects. This open and collaborative approach will engage different research partners to host, mentor, develop, lead and co-lead research projects.

5 Governance

A steering committee will oversee the development and progress of the research strategy, supported by the existing governance framework of the Cumberland Plain Conservation Plan.

5.1 Steering committee

The CPCP Research Program Steering Committee will oversee the development of the research strategy and its first 4 years. The steering committee includes representatives from the department and WSU. The department's Executive Implementation Committee will be responsible for strategic oversight of the implementation of the CPCP and will receive regular updates regarding the research program.

The objectives of the steering committee are to:

- achieve outcomes – it will ensure funded research helps to achieve the social, economic and environmental outcomes identified in the CPCP
- ensure cost-effectiveness – it will work closely with the department and other research partners to deliver a cost-effective research program and gain extra funding from sources such as grants and partnerships where possible
- provide quality research findings for stakeholders – it will ensure research outputs are relevant, based on the best available evidence and readily available in forms that users can access, understand and use
- build capacity – it will foster the sharing of skills and knowledge to the department and between research institutions, government agencies and the local communities of the Cumberland Plain.

To support the delivery of priority research WSU will also work closely with stakeholders and CPCP working groups, such as the koala and restoration groups, for input on projects.

The overarching governance framework is shown in Figure 7.

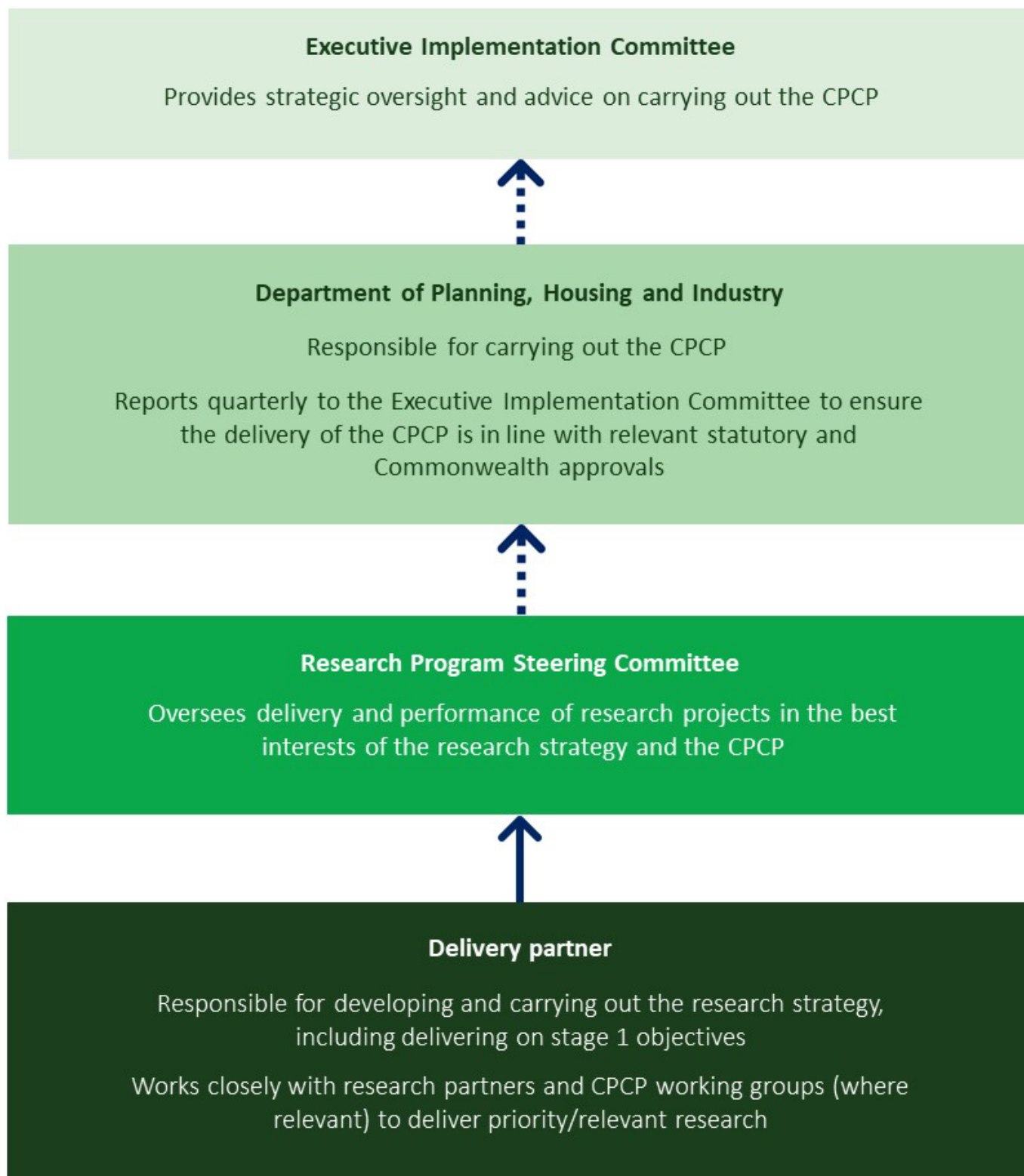


Figure 7. Governance framework for the research program

6 Monitoring, reporting and evaluation

Monitoring, reporting and evaluation processes are in place to ensure that the strategy and research program deliver relevant high-value information to help carry out CPCP objectives. A regular review process will ensure the strategy is updated as new knowledge and priorities emerge over the life of the CPCP to 2056.

6.1 Strategy review and evaluation

The strategy will be adapted over time and as knowledge, practices and priorities evolve. While we can reasonably predict certain aspects of management in the region, it is less certain how individual species and ecosystems will respond to emerging pressures and how community values will change over time. Actions undertaken to deliver the CPCP will also change conditions and, therefore, influence priorities.

The strategy and research program will be reviewed on a 5-year cycle as part of an independent external review of the CPCP. The strategy will be refined and new stages of the implementation program developed in response to those reviews.

6.2 Stage 1 research program reporting and evaluation

To assess the progress and effectiveness of the stage 1 research program, WSU must provide quarterly reports to the steering committee. The reports must show:

- how programs are meeting objectives and other milestones
- that the research is being delivered within budget and accesses other funding/resources
- that there are broad working partnerships within projects, including with other institutions
- how data is being shared with the public and the government (such as through BioNet and SEED)
- that information is translated for policy and management
- that programs support the delivery of the CPCP and detail any other impacts.

7 Acknowledgements

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Appendix

Threatened species and ecological communities in the Cumberland Plain

Acronyms: Biodiversity Conservation Act 2016 (NSW) (BC Act); Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act); Plant Community Type (PCT); Threatened Ecological Community (TEC)

Table 5. Vegetation communities and threatened ecological communities

PCT no.	PCT name	BC Act TEC name	NSW status	EPBC Act TEC name	EPBC status
724	Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	Shale-Gravel Transition Forest	Endangered	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically endangered
849	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	Cumberland Plain Woodland	Critically endangered	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically endangered
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Cumberland Plain Woodland	Critically endangered	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically endangered
725	Broad-leaved Ironbark - Melaleuca decora shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin Bioregion	Cooks River Castlereagh Ironbark Forest	Endangered	Cooks River/Castlereagh Ironbark Forest	Critically endangered
781	Coastal freshwater lagoons of the Sydney Basin Bioregion and South East Corner Bioregion	Freshwater Wetlands	Endangered	Freshwater Wetlands	Not listed
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	River-flat Eucalypt Forest	Endangered	River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria	Critically endangered

PCT no.	PCT name	BC Act TEC name	NSW status	EPBC Act TEC name	EPBC status
830	Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Moist Shale Woodlands	Endangered	Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically endangered
1395	Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion	Shale Sandstone Transition Forest	Critically endangered	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Critically endangered
1800	Swamp Oak open forest on river flats of the Cumberland Plain and Hunter Valley	Swamp Oak Forest	Endangered	Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of NSW and South East Queensland ecological community	Endangered

Table 6. Threatened species

Species name	Common name	Credit class (BC Act)	Type	EPBC Status	BC Status
<i>Acacia bynoeana</i>	Bynoe's wattle, tiny wattle	Species	Shrub	Vulnerable	Endangered
<i>Acacia pubescens</i>	Downy wattle, hairy stemmed wattle	Species	Shrub	Vulnerable	Vulnerable
<i>Allocasuarina glareicola</i>	-	Species	Shrub	Endangered	Endangered
<i>Anthochaera phrygia</i>	Regent honeyeater	Species / Ecosystem	Bird	Critically Endangered	Critically Endangered
<i>Botaurus poiciloptilus</i>	Australasian bittern	Ecosystem	Bird	Endangered	Endangered
<i>Callocephalon fimbriatum</i>	Gang-gang cockatoo	Species / Ecosystem	Bird	Not listed	Vulnerable
<i>Calyptrorhynchus lathamii</i>	Glossy black-cockatoo	Species / Ecosystem	Bird	Not listed	Vulnerable
<i>Cercartetus nanus</i>	Eastern pygmy-possum	Species	Mammal	Not listed	Vulnerable
<i>Chalinolobus dwyeri</i>	Large-eared pied bat, large pied bat	Species	Mammal	Vulnerable	Vulnerable
<i>Cynanchum elegans</i>	White-flowered wax plant	Species	Epiphytes and climbers	Endangered	Endangered

Species name	Common name	Credit class (BC Act)	Type	EPBC Status	BC Status
<i>Dasyurus maculatus</i> (SE mainland population)	Spotted-tail quoll, spot-tailed quoll, tiger quoll (southeastern mainland population)	Ecosystem	Mammal	Endangered	Vulnerable
<i>Dillwynia tenuifolia</i>	-	Species	Shrub	Not listed	Vulnerable
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	-	Species	Shrub	Not listed	Vulnerable
<i>Eucalyptus benthamii</i>	Camden white gum, Nepean river gum	Species	Tree	Vulnerable	Vulnerable
<i>Grevillea juniperina</i> subsp. <i>Juniperina</i>	Juniper-leaved grevillea	Species	Shrub	Not listed	Vulnerable
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower grevillea	Species	Shrub	Vulnerable	Vulnerable
<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle	Species / Ecosystem	Bird	Not listed	Vulnerable
<i>Heleioporus australiacus</i>	Giant burrowing frog	Species	Amphibian	Vulnerable	Vulnerable
<i>Hibbertia fumana</i>	-	Species	Shrub	Not listed	Critically endangered
<i>Hibbertia puberula</i>	-	Species	Shrub	Not listed	Endangered
<i>Hieraaetus morphnoides</i>	Little eagle	Species / Ecosystem	Bird	Not listed	Vulnerable
<i>Lathamus discolor</i>	Swift parrot	Species / Ecosystem	Bird	Critically Endangered	Endangered
<i>Litoria aurea</i>	Green and golden bell frog	Species	Amphibian	Vulnerable	Endangered
<i>Lophoictinia isura</i>	Square-tailed kite	Species / Ecosystem	Bird	Not listed	Vulnerable
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>	Marsdenia viridiflora subsp. viridiflora - endangered population	Species	Epiphytes and climbers	Not listed	Endangered
<i>Maundia triglochinos</i>	-	Species	Herbs and forbs	Not listed	Vulnerable

Species name	Common name	Credit class (BC Act)	Type	EPBC Status	BC Status
<i>Melaleuca deanei</i>	Deane's melaleuca	Species	Shrub	Vulnerable	Vulnerable
<i>Meridolum corneovirens</i>	Cumberland Plain land snail	Species	Invertebrate	Not listed	Endangered
<i>Micromyrtus minutiflora</i>	-	Species	Shrub	Vulnerable	Endangered
<i>Myotis Macropus</i>	Southern myotis	Species	Mammal	Not listed	Vulnerable
<i>Ninox strenua</i>	Powerful owl	Species / Ecosystem	Bird	Not listed	Vulnerable
<i>Persicaria elatior</i>	Tall knotweed	Species	Herbs and forbs	Not listed	Vulnerable
<i>Persoonia bargoensis</i>	Bargo geebung	Species	Shrub	Vulnerable	Endangered
<i>Persoonia hirsuta</i>	Hairy geebung, hairy persoonia	Species	Shrub	Endangered	Endangered
<i>Persoonia nutans</i>	Nodding geebung	Species	Shrub	Endangered	Endangered
<i>Petauroides volans</i>	Greater glider	Species	Mammal	Vulnerable	Not listed
<i>cPetaurus norfolcensis</i>	Squirrel glider	Species	Mammal	Not listed	Vulnerable
<i>Phascolarctos cinereus</i>	Koala	Species / Ecosystem	Mammal	Vulnerable	Vulnerable
<i>Pimelea curviflora var. curviflora</i>	-	Species	Shrub	Vulnerable	Vulnerable
<i>Pimelea spicata</i>	Spiked rice-flower	Species	Shrub	Endangered	Endangered
<i>Pomaderris brunnea</i>	Rufous pomaderris	Species	Shrub	Vulnerable	Endangered
<i>Pommerhelix duralensis</i>	Dural land snail	Species	Invertebrate	Endangered	Endangered
<i>Pseudophryne australis</i>	Red-crowned toadlet	Species	Amphibian	Not listed	Vulnerable
<i>Pteropus poliocephalus</i>	Grey-headed flying-fox	Species / Ecosystem	Mammal	Vulnerable	Vulnerable
<i>Pterostylis saxicola</i>	Sydney plains greenhood	Species	Orchid	Endangered	Endangered

Species name	Common name	Credit class (BC Act)	Type	EPBC Status	BC Status
<i>Pultenaea parviflora</i>	-	Species	Shrub	Vulnerable	Endangered
<i>Pultenaea pedunculata</i>	Matted bush-pea	Species	Shrub	Not listed	Endangered
<i>Rostratula australis</i>	Australian painted snipe	Ecosystem	Bird	Endangered	Endangered
<i>Tyto novaehollandiae</i>	Masked owl	Species / Ecosystem	Bird	Not listed	Vulnerable

Information sourced from Appendix D in the CPCP.