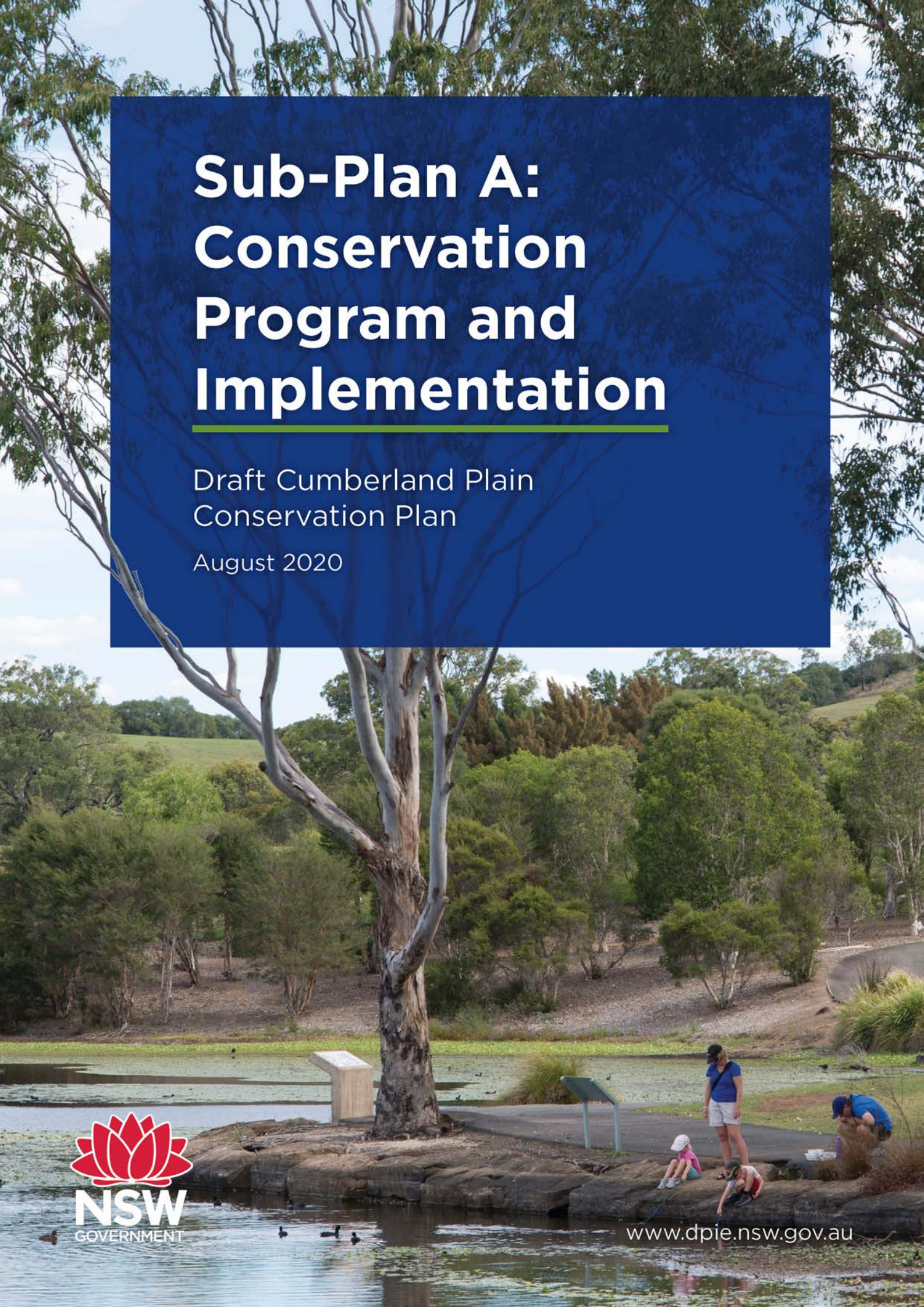
Sub-Plan A: Conservation Program and Implementation

Draft Cumberland Plain Conservation Plan

August 2020



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Cover: A family enjoying the Australian Botanic Garden at Mount Annan, DPIE

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Acknowledgement of Country

The development of the Cumberland Plain Conservation Plan acknowledges more than 60,000 years of continuous Aboriginal connection to the land that makes up NSW.

This Plan recognises that, as part of the world's oldest living culture, traditional Aboriginal and Torres Strait Islander owners and custodians of the Australian continent and adjacent islands share a unique bond to Country — a bond forged through thousands of years of travelling across lands and waterways for ceremony, religion, trading and seasonal migration.

Aboriginal peoples maintain a strong belief that if we care for Country, it will care for us. The area covered by the Cumberland Plain Conservation Plan is cared for by three Aboriginal groups: the Darug, Dharawal and Gundungurra. Others, such as the Eora, Darkinjung, Wiradjuri and Yuin 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 responsibilities towards Aboriginal peoples living in the area.

This significant connection to Country has played an important part in shaping this Plan.

For Traditional Owners, Country takes in everything within the physical, cultural and spiritual landscape - landforms, waters, air, trees, rocks, plants, animals, foods, medicines, minerals, stories and special places. It includes cultural practice, kinship, knowledge, songs, stories and art, as well as spiritual beings, and people: past, present and future.

Contents

Executive summary

The *Cumberland Plain Conservation Plan* (the Plan) has been developed to meet requirements for strategic biodiversity certification under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and strategic assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

The Plan identifies strategically important biodiversity areas within the Cumberland subregion to offset the biodiversity impacts of future urban development, while ensuring the Western Parkland City is a vibrant and liveable city.

Sub-Plan A: Conservation Program and Implementation (Sub-Plan A) supports the Plan by providing the framework for implementing the Plan's conservation program. Sub-Plan A details the conservation program including its commitments and actions that will be required to realise the Plan's vision to 'support Western Sydney's biodiversity and growth' to 2056 and beyond.

Significant conservation planning work has been undertaken to develop the Plan. This has involved identifying the biodiversity values of the area, understanding and assessing the potential impacts of future growth on these values, and developing a conservation program that can achieve biodiversity outcomes now and into the future. This is one of the largest conservation planning exercises ever undertaken in Australia.

The conservation program is focused on establishing an enhanced network of conservation lands in the Plan Area to improve ecological resilience and function at a landscape scale and in perpetuity.

The conservation program will meet commitments for five core categories:

- avoiding and minimising biodiversity impacts as the critical first step for strategic conservation planning in Western Sydney
- mitigating indirect and prescribed impacts from future development on biodiversity values through planning controls and environmental management systems
- establishing new conservation lands as offsets in regionally strategic locations to protect the area's threatened ecological communities, species and their habitats in perpetuity, while providing opportunities for ecological restoration
- managing landscape-scale threats to biodiversity by addressing weeds, pest animals, fire, disease and climate change
- building knowledge and capacity across Western Sydney's community and stakeholders through engagement, research and capacity building.

The conservation program will be implemented over the life of the Plan through a series of planned and managed actions governed by an implementation and assurance framework.

The NSW Government has identified three reserve areas within the Plan Area as being critical to the protection of BC Act and EPBC Act-listed threatened ecological communities (TECs) and species, and to enhance ecological connectivity across the landscape to protect biodiversity. These are the Georges River Koala Reserve, announced as part of the Plan, and two additional public reserves under investigation for feasibility:

- the Gulguer Reserve Investigation Area
- the Confluence Reserve Investigation Area

Other areas within the strategic conservation area have also been identified for further investigation as future reserves to provide greater landscape connectivity such as Bargo. The Plan

will prioritise establishing these reserves in the first five years of implementation. This will include creating biodiversity stewardship sites on land currently owned by the NSW Government and on other land in these areas if they become available for acquisition.

Creating biodiversity stewardship sites and new public reserves in these priority areas will help deliver the Plan's commitment of protecting at least 5,475 hectares of impacted native vegetation communities within new conservation lands.

The NSW Government has committed $84 million in the first five years to implement the Plan. This includes funding to plant 100,000 trees to restore koala habitat in the Georges River Koala Reserve and other areas of important koala habitat, establishing biodiversity stewardship agreements on private land and constructing 120 kilometres of koala exclusion fencing to protect koalas from increasing threats such as vehicle strike and dog attacks.

The Plan's implementation and assurance framework will include regular review through a dedicated evaluation program using the principles of adaptive management. This is to ensure that the strategic conservation outcomes are achieved, the biodiversity and social benefits are delivered in perpetuity, and biodiversity offsets align with the staging of development.

The evaluation program will involve collecting information, tracking progress and reporting on intended outcomes. The NSW Government is committed to regularly examining its programs to ensure they are effectively achieving their intended outcomes. The evaluation program will be finalised in close consultation with key delivery partners and will be updated throughout the life of the Plan.

Implementation of the Plan will require collaboration and support across the multitude of stakeholders in Western Sydney and all levels of government. The department has primary responsibility for implementing the Plan and will work closely with key government and non-government partners to establish formal agreements to deliver the Plan's conservation program.

The infrastructure corridors program is administered by Transport for NSW, who are a major project partner in the strategic conservation planning. An executive implementation committee with executive-level representatives from key government agencies will be established to oversee implementation of the Plan.

Delivering the Conservation Program to 2056

28 commitments

5,475 hectares of native vegetation protected within conservation lands as offsets

Up to **11,000** hectares of new conservation lands to deliver in perpetuity biodiversity outcomes

3,670 hectares of native vegetation will be avoided from development in the nominated areas

Fund research and capacity-building programs

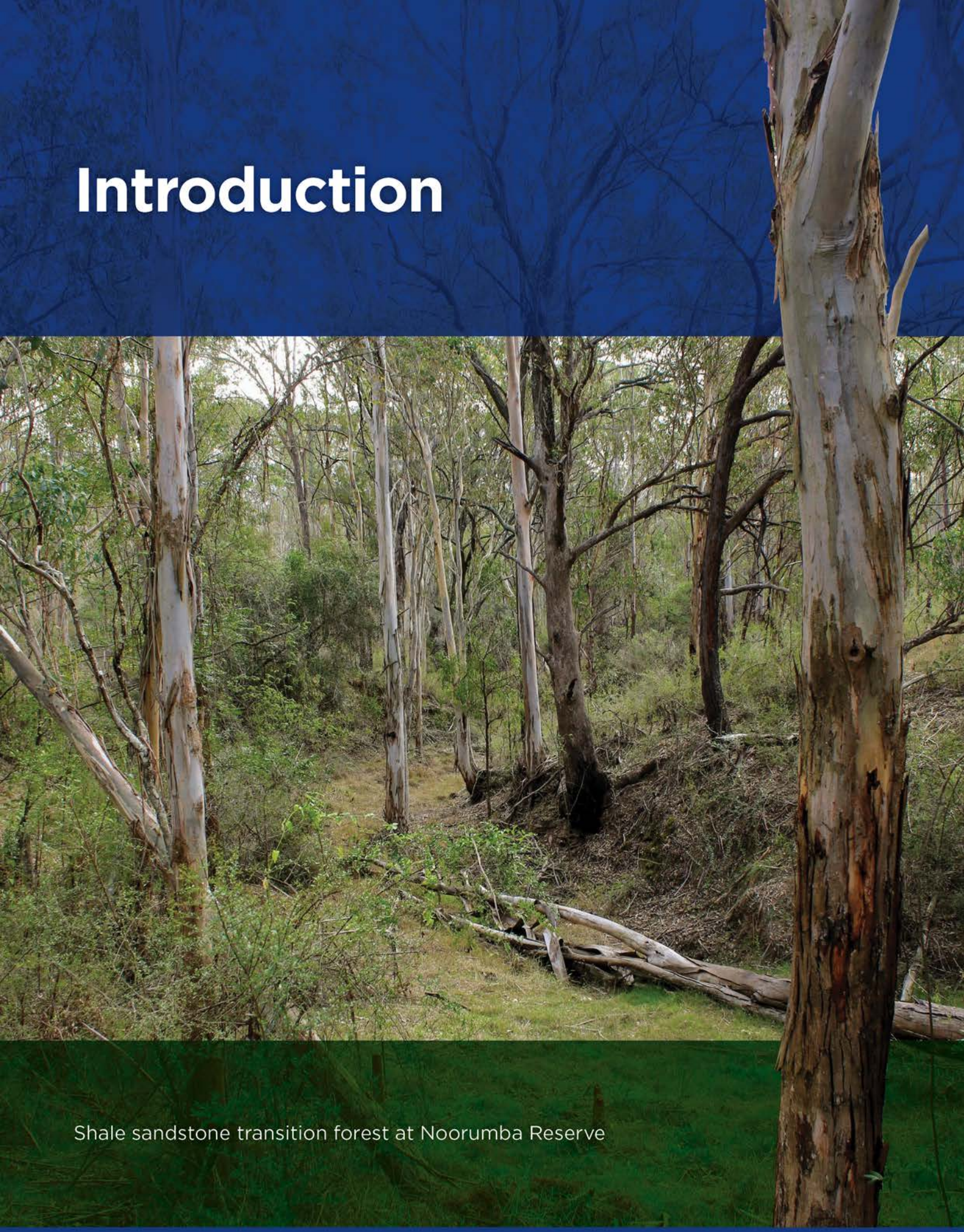
$84 million over 5 years for:

Plant **100,000** trees to restore koala habitat in the Georges River Koala Reserve

Establish Georges River Koala Reserve to protect and restore up to **1,885** hectares of important koala habitat

Install up to **120** km of koala exclusion fencing to protect koalas from increasing threats such as vehicle strike and dog attacks

Introduction



Shale sandstone transition forest at Noorumba Reserve

Introduction

Strategic conservation planning in Western Sydney

The department has undertaken strategic conservation planning to develop the *Draft Cumberland Plain Conservation Plan* (the Plan).

The Plan Area covers much of the Cumberland subregion, which is home to a rich variety of plants, animals and their habitats. These include the largest koala population in Sydney—the Southern Sydney koala population, the Cumberland Plain Land Snail, foraging habitat for the Swift Parrot and significant plants such as the Nodding Geebung and Spiked Rice-flower.

The Plan will identify and protect important biodiversity in the new urban development areas (referred to in the Plan as 'nominated areas') of the Western Parkland City. It will also support conservation outside those areas through new or additions to national parks and public reserves, investing in biodiversity stewardship sites on privately owned land, and ecological restoration of the Cumberland subregion's native vegetation communities.

These actions will offset impacts on biodiversity from developing Western Sydney's four nominated areas and major infrastructure corridors over the next four decades (see Figure 3). At the same time, they will help to improve ecological resilience and function in the Cumberland subregion in perpetuity. Improving ecological resilience and function by understanding the environment at the landscape scale will best safeguard Western Sydney's natural environment over the long term and in a changing climate.

The Plan provides more information on the scope of development in Western Sydney and its linkages with other NSW Government plans and strategies. These include the *Greater Sydney Region Plan—A metropolis of three cities* (GSC, 2018), *Western City District Plan* (GSC, 2018b) and *Future Transport Strategy 2056* (Transport for NSW, 2018).

The benefit of strategic conservation planning

Strategic conservation planning provides an opportunity to undertake a landscape-scale assessment of biodiversity. Landscape-scale assessments can look at the direct, indirect and cumulative impacts of a series of developments across a landscape. They take place ahead of a proposed, usually large-scale development or series of development, whereas project specific site assessments look at individual actions or are in response to an existing proposal.

Using a landscape approach early in the process enables decision-makers to identify and protect the most important habitat for species population viability and connectivity at a regional scale, while identifying areas that can be developed without the need for further biodiversity assessment, provided development occurs in accordance with an approved plan.

Purpose of Sub-Plan A

Sub-Plan A: Conservation Program and Implementation is one of two sub-plans that support the Plan's implementation. The other is *Sub-Plan B: Koalas* (Sub-Plan B) (see Figure 1).

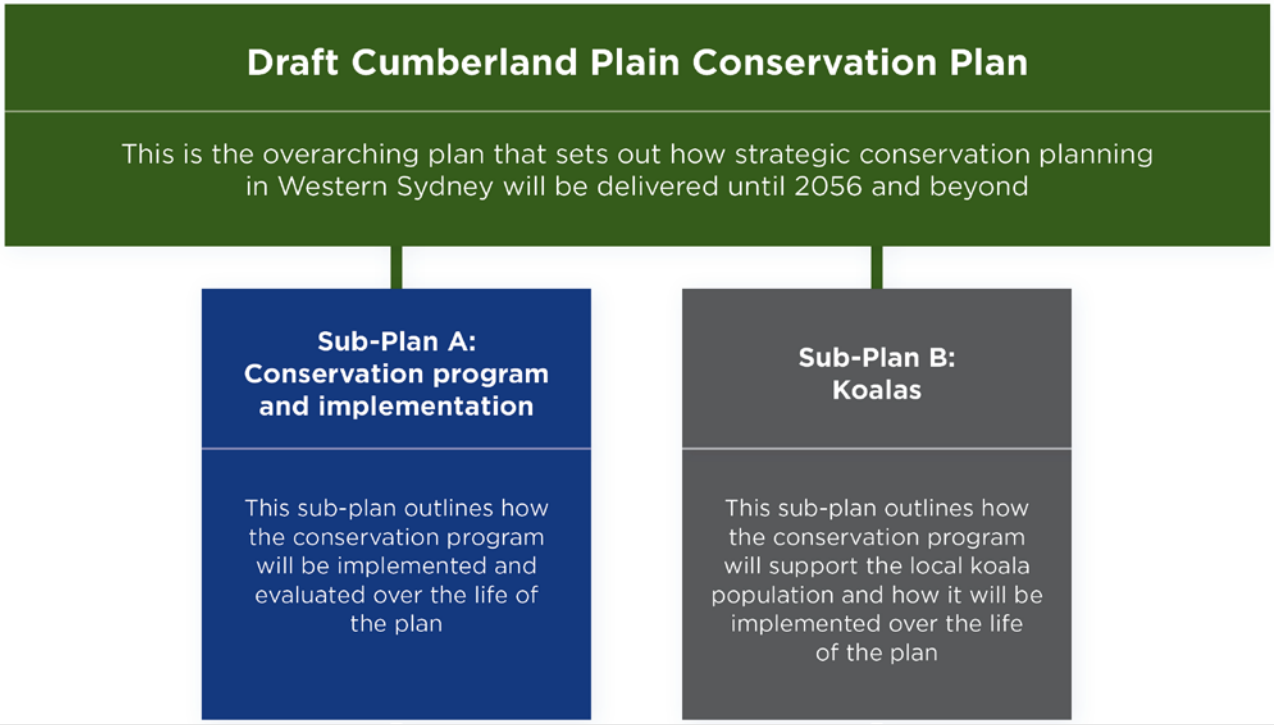


Figure 1: Draft Cumberland Plain Conservation Plan and Sub-plans

Sub-Plan A sets out the framework for the conservation program. It details how conservation will be implemented over the life of the Plan to 2056 through a series of considered and managed actions to achieve the Plan's objective, outcomes and vision. The Plan's objective is to 'deliver biodiversity outcomes and support the ecological function of the Cumberland subregion while improving liveability and supporting urban development in Western Sydney'. The remaining elements of the Plan's program logic is described in Figure 4.

The conservation program will deliver commitments to protect threatened ecological communities, species and their habitats. It will also improve overall ecological resilience and function to provide an enduring conservation legacy for the people of Western Sydney.

The conservation program seeks to meet legislative requirements under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). These requirements are to avoid, mitigate and offset the impacts of development under the Plan on:

- NSW biodiversity values, which are protected under the BC Act
- Matters of National Environmental Significance (MNES) and other matters protected under the EPBC Act, including impacts to Commonwealth Land.

Commitments and actions included in the conservation program have been informed by the draft *Cumberland Plain Assessment Report* (the Assessment Report), which assessed the direct, indirect, prescribed and cumulative impacts on biodiversity and other relevant EPBC Act matters as a result of developing the Western Sydney nominated areas and major infrastructure corridors described in the Plan. The Assessment Report also assesses the adequacy of the Plan to address

impacts and meet legislative requirements. Findings were iteratively reviewed and incorporated into Sub-Plan A as required.

Sub-Plan A also outlines the framework for the evaluation program. This program will enable the NSW Government and delivery partners to track and review projects over time to ensure outcomes are met. It will provide assurance that the Plan's outcomes and commitments are being satisfied, and that delivery partners are clear about how to appropriately measure and report on requirements in a coordinated manner. A detailed evaluation program will be finalised in consultation with key delivery partners and will be updated throughout the life of the Plan.

Community and stakeholder engagement

The Plan will be implemented for the people of Western Sydney, both present and future. Community and stakeholder engagement is an important part of strategic conservation planning in Western Sydney.

Since late 2017, the department has consulted in depth with key stakeholders to develop the Plan. These consultations have included local councils, landholders, industry groups, environmental groups, Local Aboriginal Land Councils (LALCs), Aboriginal groups and members of the community. Engagement has included targeted meetings, workshops and community drop-in sessions.

The early engagement period found a strong desire in the community to protect biodiversity, waterways and wetlands, with publicly accessible reserves being the preferred method to protect biodiversity in perpetuity. The community response highlighted the importance of preserving accessible open spaces for recreation and native vegetation corridors for wildlife movement and migration.

The Campbelltown and Wollondilly communities emphasised protecting the region's koala population through new reserves, restoring important habitat and reducing roadkill.

Developers supported the certainty provided by the department's biodiversity approvals for nominated areas, which facilitates future development. Conversely, residents were concerned about losing the rural character of some nominated areas to over-development, and that new housing areas would not be matched by increased investment in public infrastructure.

Figure 2 summarises some of the key responses from stakeholders. A full report on the community engagement process, including what we heard and responses to the feedback received, is available on the department's website.

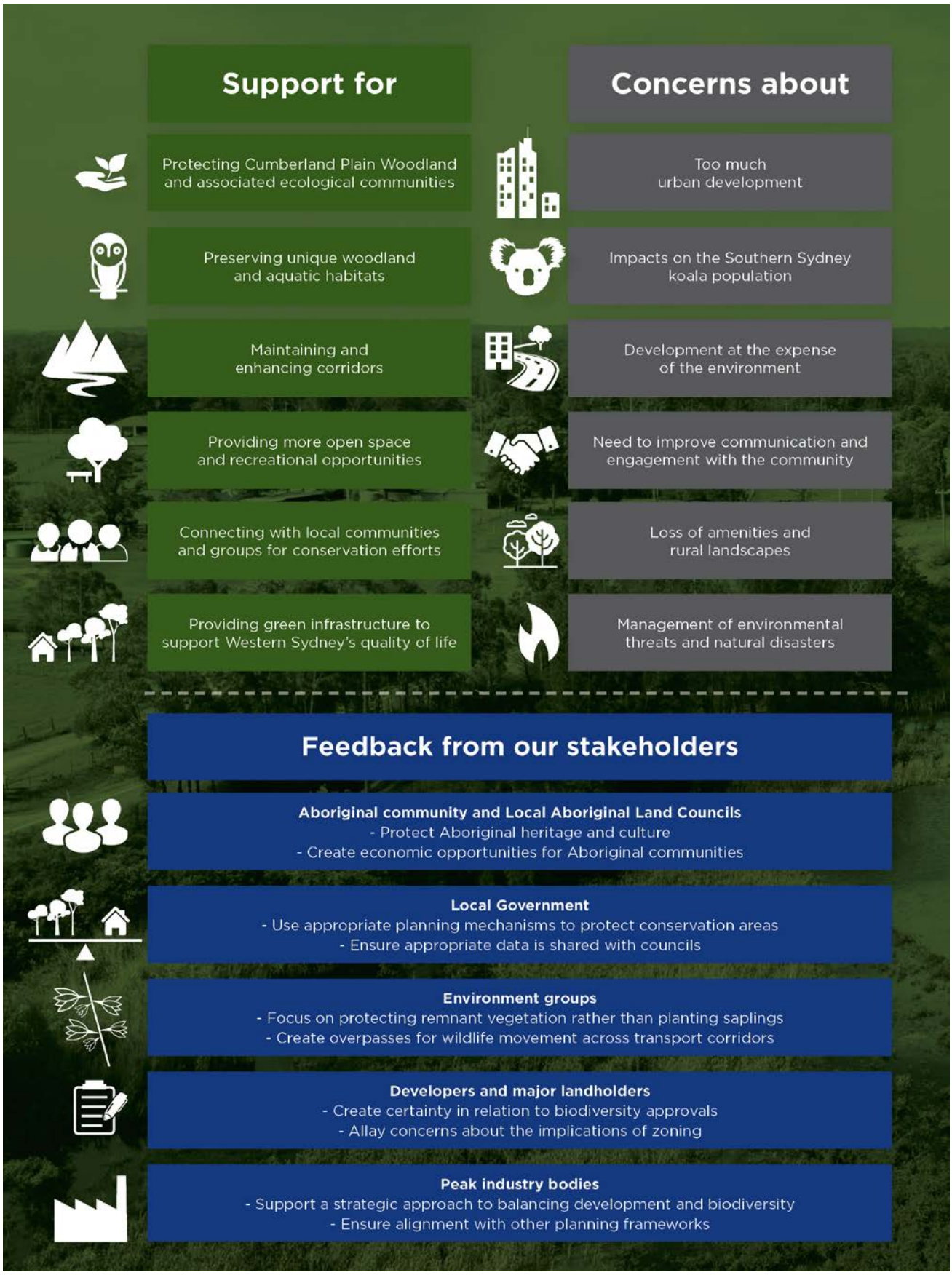


Figure 2: Feedback from stakeholders and the community

Structure of Sub-Plan A

Sub-Plan A is structured in four parts:

1. The **conservation framework** identifies the underlying logic to achieve the Plan's vision, objective, outcomes, commitments and actions, and the information that informed the development of the conservation program.
2. The **conservation program** details the commitments and actions to achieve the outcomes of the Plan, including the methods used to identify conservation priorities.
3. The **implementation and assurance framework** outlines how the conservation program will be implemented, including overall governance of the Plan, the roles and responsibilities for delivery and the Plan's assurance mechanisms.
4. The **evaluation program** outlines the program that will support the implementation of the Plan through monitoring, evaluating, reporting and adaptive management.

Conservation Framework

The Spotted-tailed Quoll is a threatened species found in Western Sydney

Conservation framework

The conservation framework underpins the design of the Plan's conservation program. It identifies:

- the biodiversity values of the Plan Area
- the program logic to achieve the Plan's vision
- how commitments have been developed according to an avoid, mitigate and offset hierarchy, and underpinning principles of the conservation program.

The Plan Area

The Plan Area extends from north of Windsor to Picton in the south and from the Hawkesbury-Nepean River in the west to the Georges River near Liverpool in the east (see Figure 3:). It covers approximately 200,000 hectares and includes the majority of the Cumberland Interim Biogeographic Regionalisation for Australia (IBRA) subregion and some minor areas of the Cataract and Wollemi IBRA subregions.

Two main water catchments drain the Plan Area: Botany Bay and the Hawkesbury–Nepean River. Together with the Georges River sub-catchment and Wianamatta (South Creek) sub-catchment, they form a broad branch-shaped drainage pattern, with an extensive network of tributaries extending out from large floodplains and across the area.

The Plan Area includes parts of eight local government areas:

- Wollondilly Shire
- Camden
- Campbelltown City
- Liverpool City
- Fairfield City
- Penrith City
- Blacktown City
- Hawkesbury City.

It also includes three Local Aboriginal Land Councils:

- Deerubbin
- Tharawal
- Gandangara.

The Plan Area includes the four nominated areas in Western Sydney identified under the *Greater Sydney Region Plan* and approximately 121 kilometres of infrastructure corridors as strategically biodiversity certified and/or strategically assessed under the Plan. The nominated areas are a key focus for urban development over the coming decades and will be centres of economic activity in Western Sydney. They are:

- Greater Macarthur Growth Area
- Greater Penrith to Eastern Creek Investigation Area
- Western Sydney Aerotropolis
- Wilton Growth Area.

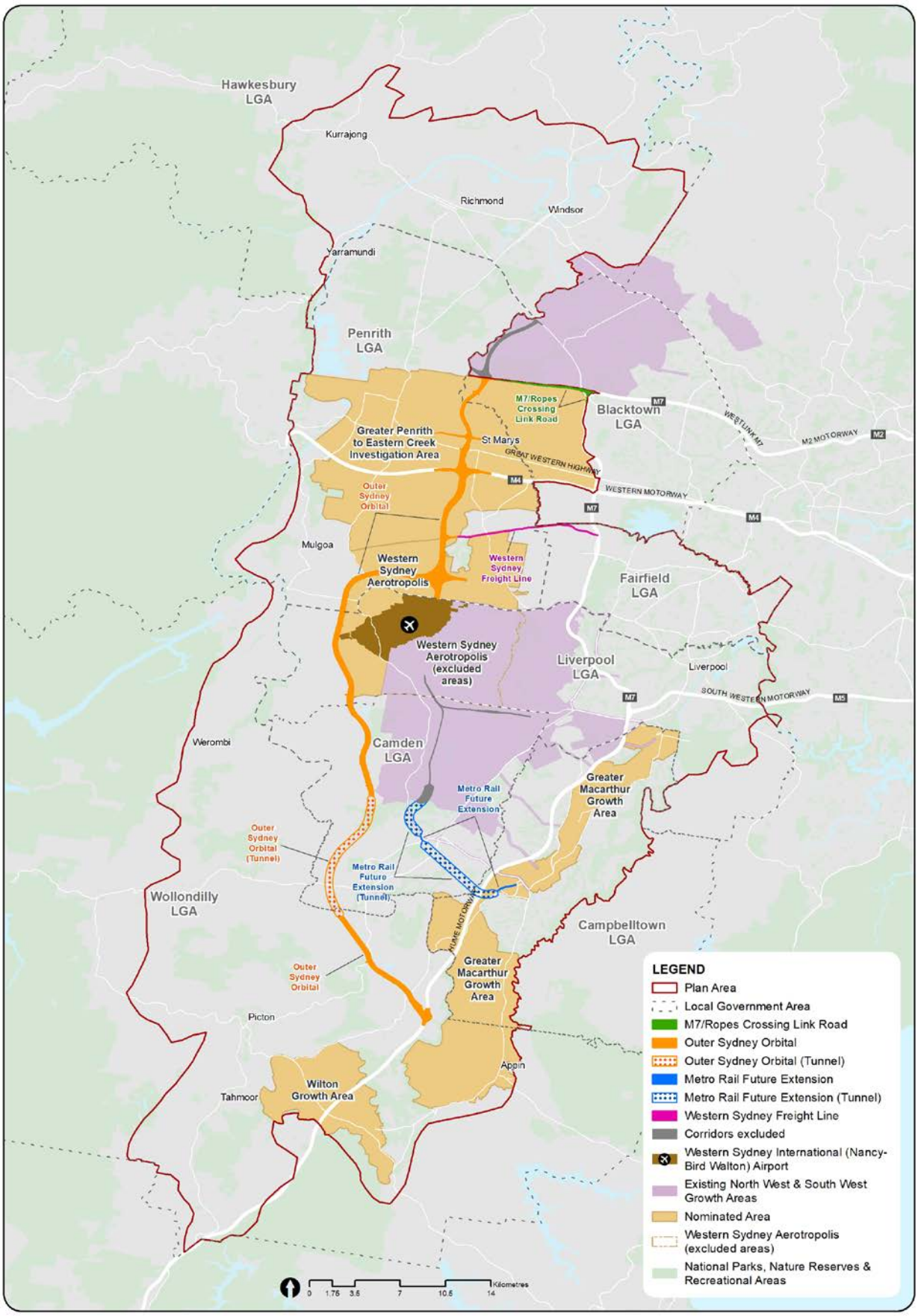


Figure 3: The Plan Area showing four nominated areas for future urban growth and major infrastructure corridors

Key major infrastructure corridors to service this new growth have been identified in *Future Transport 2056*. The four major corridors described in the Plan are:

- potential future extension of Sydney Metro Greater West, south from Western Sydney Aerotropolis to Macarthur (except for those areas in the South West Growth Area)
- the Western Sydney Freight Line corridor
- Outer Sydney Orbital between Box Hill and the Hume Motorway near Menangle
- M7/Ropes Crossing Link Road.

Existing land uses comprise mainly freehold land zoned rural and residential, with greater than 75% of the remaining native vegetation in the Cumberland subregion in private ownership (DECCW 2010). Currently, around 10% of the native vegetation in the Plan Area is protected within a reserve or through a biodiversity covenant (DPIE 2018).

Conservation values

Threatened species and communities

The native vegetation in the Plan Area is diverse and unique. It supports a variety of flora and fauna, including more than 100 threatened or migratory fauna and flora species that are listed under either NSW or Commonwealth legislation or both.

Historical and ongoing land use pressures have had a significant impact on the area's biodiversity, particularly for many birds and mammals. The area is now a highly fragmented landscape, meaning that the connectivity of the threatened ecological communities and habitat needed for species movement has been lost or reduced.

As at 2010, only 13% of the pre-1750 extent of the Cumberland subregion's vegetation remains intact, with an additional 12% occurring as scattered trees (DECCW 2010). The remaining vegetation communities are mainly represented by grassy woodlands and open forests, with around 40 plant community types[1] (PCTs) identified (DPIE 2018).

Of the 40 PCTs in the area, approximately 30 are associated with BC Act- or EBPC Act-listed threatened ecological communities (TECs) or are classified as over-cleared vegetation types (greater than 70% cleared compared with the notional original extent) (Open Lines 2020).

Areas of remaining native vegetation are often of high conservation value as they may contain the only remaining habitat for species and ecological communities that occur only in the Cumberland subregion (Open Lines 2020).

Landscape connectivity

Landscape connectivity is important for biodiversity as it allows the linkage of habitats, species, communities and ecological processes. For example, connectivity supports species movement including to escape predators but also to reduce inbreeding; it enables the movement of pollen and seeds as well as maintaining diversity to enable resilience to adverse climatic or fire conditions. Once a landscape is fragmented, it is more prone to additional degradation. As such, as development increases, remnant vegetation becomes more fragmented and the risk of local extinctions increases.

[1] Plant community types (PCTs) are the standard operational classification hierarchy for native vegetation in NSW. Once PCTs are mapped, the potential extent and location of each TEC can be inferred through this relationship.

Connectivity in the Cumberland subregion is already compromised. Once clearing levels exceed 70% of the landscape, biodiversity loss from fragmentation increases (DECCW 2010). This threshold has been surpassed in the Cumberland subregion.

This can be reduced and reversed by enhancing connections. Extending existing reserves and biodiversity stewardship sites and establishing new protected areas will build these connections. Active management and maintenance of the protected areas and their surroundings reduces threats such as pests and weeds.

Meeting the Plan's vision

The Plan's vision is to 'support Western Sydney's biodiversity and growth'.

Its objective is 'to deliver biodiversity outcomes and support the ecological function of the Cumberland Plain, improving liveability and facilitating urban development in Western Sydney'.

The Plan's program logic describes the relationship between the vision, objective, outcomes, commitments and actions (see Figure 4). This includes eight environmental, social and economic outcomes to benefit biodiversity and the local community (see Figure 5).

The **conservation program** has been developed to ensure the delivery of the Plan's outcomes. The commitments and actions will address biodiversity impacts from projected growth while delivering biodiversity and social outcomes in perpetuity. This will be through the establishment of new conservation lands to offset biodiversity impacts, management of landscape-scale threats to enhance ecological resilience and supporting research and community engagement initiatives.

The Plan's vision is ambitious, so a robust and flexible process for securing biodiversity offsets over time will be established to endure for the life of the Plan to 2056. This will ensure the conservation program stays on track to meet its strategic commitments and outcomes.

The Plan's **implementation and assurance framework** consists of:

- clear governance arrangements
- a reconciliation accounting process to track development impacts and offsets secured
- conservation land selection steps to guide the selection and acquisition of offsets
- adaptive management steps to be implemented through the NSW planning system if offsets are not in line with development impacts.

The full package of commitments and actions is detailed in Appendix A. Commitments and actions.

The Plan's **evaluation program** will include monitoring, evaluation and reporting to ensure the Plan stays on track and the commitments and outcomes are delivered. The effectiveness and appropriateness of actions in helping to achieve specific outcomes will be monitored, reported on and evaluated. Evaluation results can then be used to support adaptive management and governance to ensure continuous improvement in implementing the Plan.

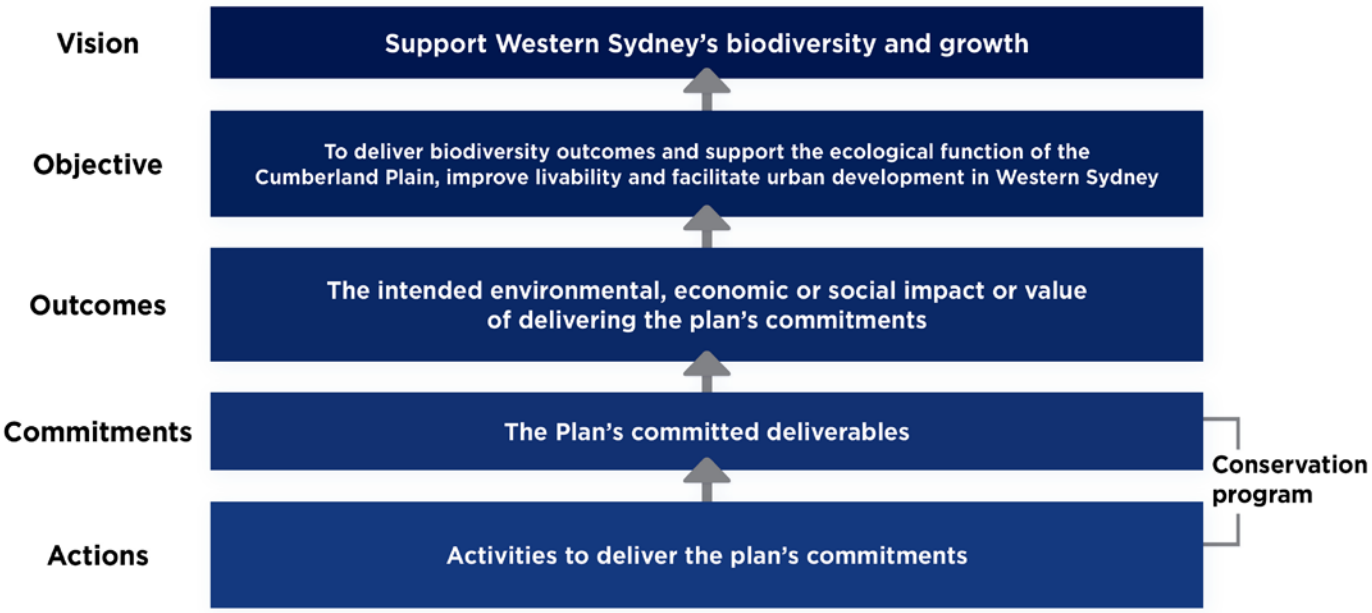


Figure 4: Program logic to achieve the Plan's vision

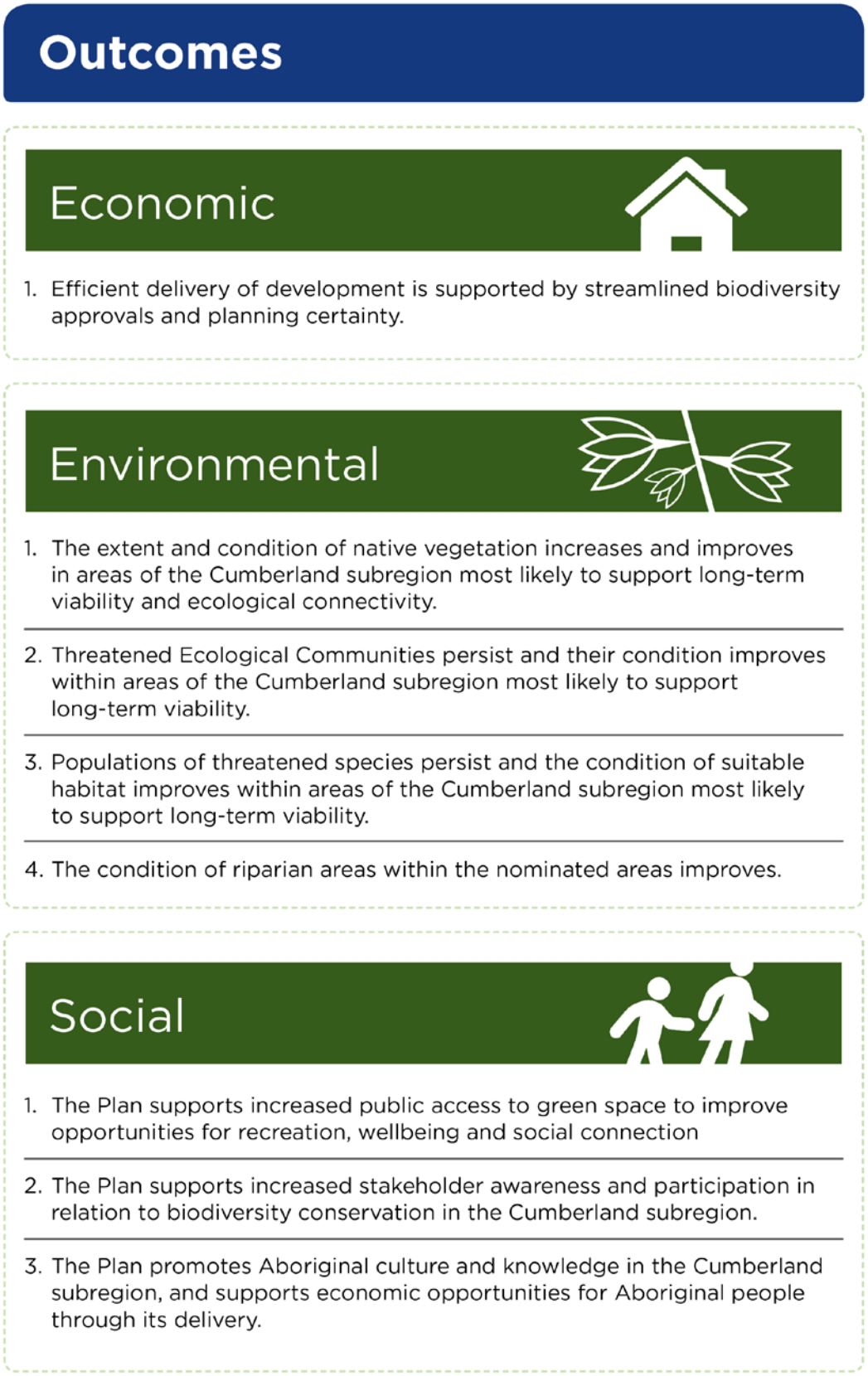


Figure 5: Draft Cumberland Plain Conservation Plan outcomes

Avoiding and minimising impacts on biodiversity

Avoiding and minimising impacts on biodiversity values is an important part of strategic conservation planning and is required under both NSW and Commonwealth legislation. It is a critical step in protecting remaining biodiversity and reducing the cumulative impacts of proposed development on the natural environment.

In developing the Plan, the department has identified areas of high biodiversity value in the four Western Sydney nominated areas where future urban development could have an impact. The department will implement the following actions to protect those areas from future development through the NSW planning framework.

Strategic planning

Avoidance criteria were used to identify (and avoid) land of high biodiversity value in the nominated areas. Avoidance criteria included, among others, intact vegetation, primary koala corridors and threatened species habitat. The avoidance criteria are listed in Appendix B. Avoidance criteria. The strategic planning process used this information to locate and design certified-urban capable land[2] in the nominated areas to avoid and minimise impacts on areas of high biodiversity value.

The certified-urban capable land is where future urban development will occur in each nominated area. The certified-urban capable land will receive strategic biodiversity certification under the *Biodiversity Conservation Act 2016* (NSW) (BC Act). The Plan also identifies those areas avoided from certification for biodiversity reasons or other environmental purposes, such as the presence of riparian corridors, or because the land cannot legally or feasibly be developed due to its topography. These areas are defined in the Plan as ‘avoided land’.

Implementing actions to avoid and minimise impacts on biodiversity

The department proposes to introduce several planning controls to provide for the ongoing protection of biodiversity values on avoided land, as identified by the Plan. These include:

- the establishment of environmental conservation (E2) zoning to protect high-value biodiversity, riparian corridors and steep slopes
- requirements to ensure that certified, urban-capable land in precinct plans covered by the biodiversity approvals are consistent with the areas of certified land, and protect avoided land identified in the Plan
- guidelines to manage impacts to biodiversity from essential infrastructure development by public authorities on non-certified land in the nominated areas.

Future avoidance within major infrastructure corridors

The major transport infrastructure included in the Plan is yet to be constructed and so the final construction alignments for the corridors are not yet certain. Therefore, additional avoidance will be achieved as designs for the infrastructure corridors are determined over the life of the Plan. To account for this, Transport for NSW will seek to avoid and minimise impacts to areas of high biodiversity value, including threatened ecological communities, species and their habitats within major infrastructure corridors described in the Plan to achieve ecologically sensitive transport infrastructure within the identified corridors (Commitments 3 and 4).

[2] Certified-urban capable land refers to the areas within the nominated areas where the NSW Government has streamlined the delivery of priority housing and infrastructure through the biodiversity certification process.

Impacts on biodiversity

The Plan's avoidance criteria (at Appendix B. Avoidance criteria) and related actions seek to avoid and minimise direct impacts on land with high biodiversity values (land that includes one or more of the avoidance criteria). However, there will be unavoidable impacts on biodiversity due to the planned growth in Western Sydney.

In line with statutory requirements, assessments of the impacts of the proposed development on matters protected under the BC Act and EPBC Act was carried out. The assessment met the BC Act requirement that it be performed by a person accredited to use the Biodiversity Assessment Method. Impacts on matters protected under the EPBC Act, including MNES and Commonwealth land, were assessed in accordance with the terms of reference for the strategic assessment agreed to under the EPBC Act. The final terms of reference are available on the department's website.

The Assessment Report examined the direct, indirect, prescribed and cumulative impacts of the proposed development, and determined whether it could cause serious and irreversible impacts.

That assessment found that urban development and proposed infrastructure corridors could have a direct impact on 1,777.8 hectares of native vegetation communities across the nominated areas and infrastructure corridors. This includes eight threatened ecological communities (TECs) listed under the BC Act and five[3] TECs listed under the EPBC Act. While there is some overlap, TEC lists are maintained at both the Commonwealth and State level and include differences in the criteria used and approach to listings. The overlap and differences in TECs, including their associations with plant community types and impacts under the Plan is presented in Appendix C. Biodiversity values to be offset through the conservation program.

In addition, potential habitat for 49 threatened species (24 fauna species and 25 flora species) may be directly impacted by the development. As for TECs, the lists for threatened species are made at both Commonwealth and State level. Of the 49 threatened species, 48 species are listed under the BC Act, 28 species are listed under the EPBC Act and 27 species listed under both pieces of legislation. This is further detailed in Appendix C. Biodiversity values to be offset through the conservation program.

Of these 49 threatened species, 15 species have been identified as being at risk of residual adverse impacts from the direct impacts of development under the Plan. These species have a direct species offset target included in the Plan's commitments and are defined in the Plan as 'target species'. This is explained further in Protecting threatened flora and fauna (see page 62).

Substantial impacts on other MNES, including migratory species, Ramsar wetlands or World Heritage or National Heritage areas, are unlikely. There are 12 Commonwealth Land sites in the Plan Area. The risks from the development under the Plan to the environment on Commonwealth land has been assessed as low for each of the 12 sites.

Development under the Plan could also result in indirect and prescribed impacts, including changes to hydrology and water quality, disruption of habitat connectivity, altered fire regimes, the spread of disease, and vehicle strikes involving fauna. Actions to mitigate indirect and prescribed impacts are further discussed in Mitigating indirect and prescribed impacts (see page 37).

[3] Including the *Coastal floodplain eucalypt forest of eastern Australia* ecological community which has been nominated for listing under the EPBC Act as 'endangered'

A summary of impacts on protected matters is provided in Table 1: Summary of impacts on biodiversity

The Assessment Report provides a complete overview of the data, methods and findings of both assessments.

Table 1: Summary of impacts on biodiversity

Value or protected matter	Impact
Total impacts to native vegetation	1,777.8 hectares
Threatened ecological communities	8 under BC Act 4 under the EPBC Act (plus the *Coastal floodplain eucalypt forest of eastern Australia* ecological community, nominated for listing)
Threatened species	25 flora species 24 fauna species
Most impacted TECs	Cumberland Plain Woodland (PCT 849/850) Shale Sandstone Transition Forest (PCT 1395) River-Flat Eucalypt Forest (PCT 835)
Target[4] species	**Flora species:** *Cynanchum elegans* *Dillwynia tenuifolia* *Epacris purpurascens var.* *Grevillea juniperina subsp. juniperina* *Hibbertia fumana* *Hibbertia puberula* *Marsdenia viridiflora subsp. viridiflora* *Persoonia nutans* *Pimelea spicata* *Pultenaea parviflora* *Pultenaea pedunculata* **Fauna species:** *Meridolum corneovirens* *Myotis Macropus* *Phascolarctos cinereus* *Lathamus discolour*
Vegetation avoided for biodiversity or other purposes in nominated areas	3,670 hectares

[4] EPBC Act and BC Act listed species identified as being at risk of residual adverse impacts from the direct impacts of development under the Plan

Total land avoided from development in the nominated areas	4,745 hectares

Addressing impacts

Strategic planning enables conservation of protected biodiversity matters through a landscape-scale approach. This approach provides a wider range of actions to offset impacts on biodiversity values compared to standard (site by site) development assessment processes.

The conservation program includes a set of commitments and actions to avoid, mitigate and offset the development impacts identified in the Assessment Report. Several inputs informed the commitments and actions (see Figure 6) including the Plan's outcomes, an offset target method to determine potential risk to biodiversity values from future development in Western Sydney (see Box 1), and the guiding principles and policies of statutory approval bodies (see Box 2).

Commitments are framed around an avoid, minimise, mitigate and offset hierarchy, as required under legislation. The conservation program section outlines these commitments in more detail.

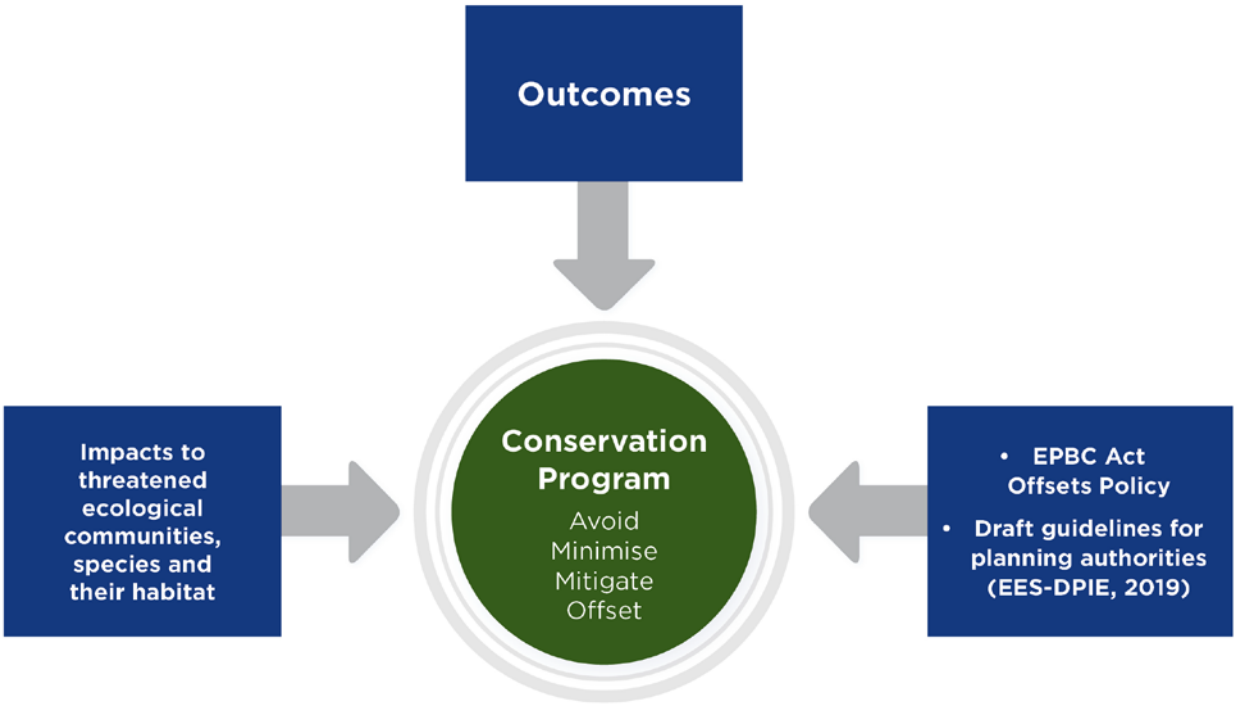


Figure 6: Inputs used to develop the conservation program

Box 1. Offset target methods

The offset target method for **threatened ecological communities** (TECs) determined offset targets based on the area impacted, in hectares, of each TEC, and was driven by two key principles:

1. impacts on higher conservation status matters require more offsets than lower status matters
2. impacts on higher condition matters require more offsets than lower condition matters.

Species offset targets were developed for each EPBC Act and BC Act-listed species likely to be at risk of residual adverse impacts from the direct impacts of development under the Plan. The method determined:

1. level of risk for EPBC Act-listed species as determined by the Assessment Report

2. a set of criteria for BC Act-listed species to address risk of residual adverse impacts

More detail on the two methods can be found in the Assessment Report

Box 2. Legislative guidelines for strategic biodiversity offset programs

Guiding principles from the draft guidelines for planning authorities for proposing conservation measures in strategic applications for biodiversity (draft guidelines for planning authorities)

The draft guidelines for planning authorities provide a set of guiding principles for demonstrating that the conservation measures proposed in an application for strategic biodiversity certification adequately address impacts on biodiversity values under section 8.7 of the BC Act.

Principle 1: Potential serious and irreversible impacts on biodiversity values are avoided and minimised.

Principle 2: The proposed conservation measures address the biodiversity values being impacted.

Principle 3: Conservation measures prioritise preservation of important conservation values.

Principle 4: Conservation measures improve biodiversity values and landscape function in the long term.

Principle 5: Conservation measures are additional to existing conservation requirements.

Principle 6: Development controls proposed as conservation measures conserve or enhance the natural environment.

Principle 7: Any proposed new National Parks are consistent with the comprehensive, adequate and representative (CAR) reserve system scientific framework (after Commonwealth of Australia 2010).

Principle 8: The implementation of conservation measures is timely and certain.

EPBC Act environmental offsets policy
This policy provides upfront guidance on the role of offsets in environmental impact assessments, and how the Australian Government Department of Agriculture, Water and Energy considers the suitability of a proposed offset. It aims to improve environmental outcomes through the consistent application of best practice offset principles, provide more certainty and transparency, and encourage advanced planning of offsets.

Conservation Program

Castlereagh Scribbly Gum Woodland is a threatened ecological community found in the north of the Plan Area

Conservation program

Significant conservation planning has been undertaken to inform the development of the conservation program, including to identify biodiversity values in the Plan Area and where conservation funding should be targeted for strategic and landscape-based outcomes.

The department used a conservation prioritisation process—the conservation priorities method (see page 27)—to identify high-value conservation lands that best support an ecologically functioning, connected landscape and which can offset impacts according to the statutory requirements of the EPBC Act and the BC Act.

The output of this process determined the Plan's strategic conservation area, which are areas of regional biodiversity significance identified to have the greatest potential to deliver long-term conservation outcomes for biodiversity within the Cumberland subregion.

The conservation program will focus on identifying and protecting priority areas for conservation from within this strategic conservation area. New conservation lands will include new national parks or additions to national parks, public reserves and biodiversity stewardship sites on private and public land. Ecological restoration of degraded habitat will play an important role in new conservation lands, expanding the area of native vegetation, creating new habitat for threatened species and maximising ecological connectivity.

New conservation lands will be established through the 'Conserving flora, fauna and associated habitat' category of commitments. This category of commitments will comprise at least 90% of conservation program funding over the life of the Plan.

The Plan's core commitment is to secure in perpetuity, a minimum of 5,475 hectares of impacted native vegetation in the Cumberland subregion through establishing new conservation lands (Commitment 8). This target has been calculated to offset biodiversity impacts from development as required under legislation (see also Box 2). The resulting area of new conservation lands, however, will be much greater than this, as it is expected that at least double that figure would be required to establish new conservation lands to meet that offset target.

New reserves or additions to existing reserves will include land for open space and recreational use that is compatible with the reserve type. New conservation lands may also include areas of native vegetation that is not directly meeting the Plan's conservation targets but will be protected collectively with the Plan's impacted native vegetation communities. The proposed Georges River Koala Reserve will also add a significant amount of additional land conserved to protect important koala habitat through the Plan, well in excess of the Plan's conservation target for koalas.

Within the first five years of the Plan's implementation, the NSW Government will prioritise the establishment of three new public reserves to help deliver the Plan's commitment of protecting at least 5,475 hectares of impacted native vegetation within new conservation lands. This is to establish a strategic upfront biodiversity offset for the Plan. The proposed reserves are described in more detail in the section Conserving flora, fauna and associated habitat (see page 41).

The NSW Government has committed $84 million in the first five years to implement the Plan. This includes funding to plant 100,000 trees planned for restoring koala habitat in the Georges River Koala Reserve, establish biodiversity stewardship agreements on private land and 120 kilometres of koala exclusion fencing to protect koalas from increasing threats such as vehicle strike and dog attacks.

The conservation program will deliver additional commitments related to threatened ecological communities, species and their habitats. These commitments will address the declining trend in biodiversity and manage increasing landscape-scale threats over the coming decades.

Climate change is likely to introduce additional threats and exacerbate existing ecosystem stressors such as fire, disease, pests and weeds. The conservation program will invest in climate change adaptation strategies for threatened ecological communities, species and their habitats in the Cumberland subregion. Commitments include funding for research to identify the most at-risk species and ecological communities and identifying priority locations such as climate refugia to support their persistence and adaptation.

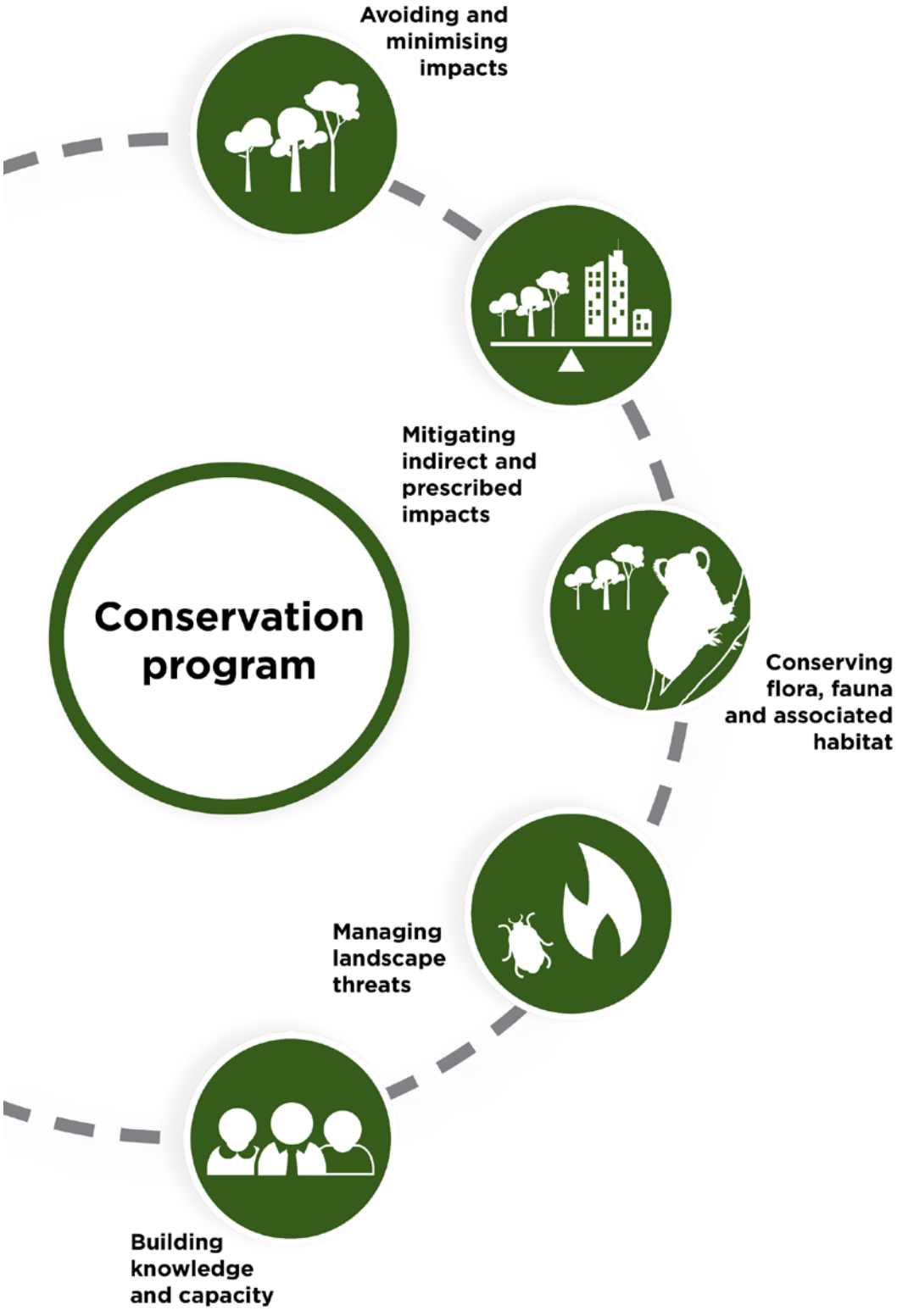
The unprecedented bushfires over the summer of 2019–20 burnt 5.3 million hectares (6.7% of NSW), including 2.7 million hectares in national parks (37% of the national park estate) and more than 80% of the Greater Blue Mountains World Heritage Area (Department of Planning, Industry and Environment 2020).

An initial assessment has been made of the significance of the fires to the Plan's conservation program. The fires had limited impact on the area's endemic species, or those species highly dependent on the Cumberland subregion (more than 80% of total records in the Cumberland subregion). But they were a reminder that the threat of bushfires to the areas' native species and communities will be exacerbated as the climate becomes hotter, drier and more susceptible to extreme weather events and natural hazards.

The conservation program will invest in measures to address the continuing risk of bushfires to the area's native species. This is further described in the section Managing bushfire risk (see page 69).

Commitments

The conservation program includes commitments that have been categorised into five categories. These commitments sit within the Plan's conservation framework to achieve the Plan's vision, objective and eight outcomes (see Figure 4 and Figure 5). They will be implemented over the life of the Plan, until 2056, through a series of planned and managed actions that have been set over varying timeframes, according to their priority and feasibility over time.



Appendix A. Commitments and actions presents the full package of commitments and actions to be implemented under the Plan. This includes additional commitments that relate to development requirements, and governance and reporting.

The conservation commitments are detailed in the sections from page 25 and provide further information on the categories of commitments relevant to the conservation program. They also detail priority actions to achieve outcomes and commitments, and address impacts on biodiversity.

Implementation

The Implementation and assurance section (see page 79) details the Plan's implementation and assurance framework, including governance arrangements, assurance mechanisms, the evaluation program, and roles and responsibilities for implementing commitments and actions.

The assurance mechanisms include:

- a reconciliation accounting process to track development impacts and offsets secured
- conservation land selection steps to guide the selection and acquisition of offsets
- adaptive management steps to be implemented through the NSW planning system if offsets are not in line with development impacts.

The Plan's evaluation program will track progress of the conservation program over the life of the Plan. It will collect and monitor data to consistently evaluate actions and to inform adaptive management decisions to ensure success of the Plan. It also includes the reporting framework which includes annual updates and a five-yearly independent report, both to be publicly available. Figure 7 presents an overview of how the conservation program will be implemented, including the conservation priorities for delivery.

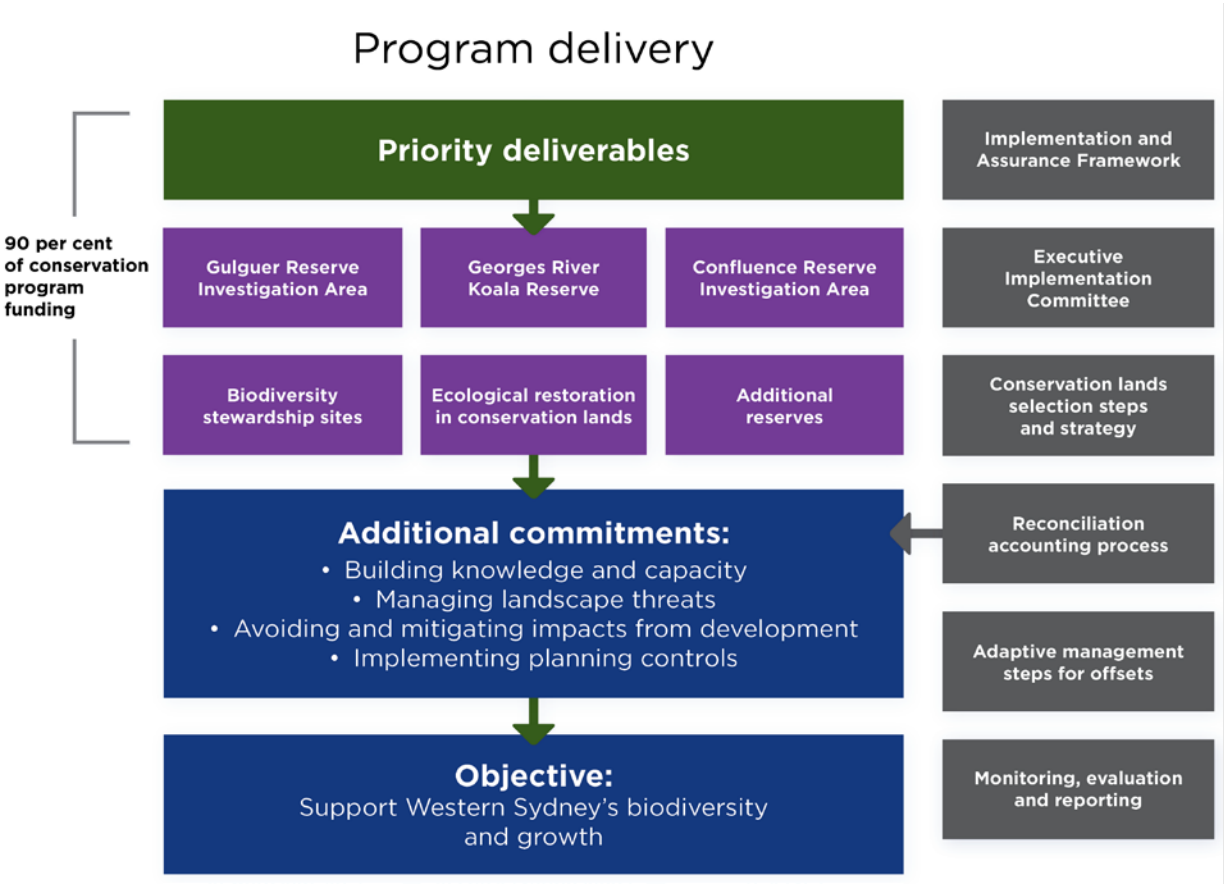


Figure 7: The delivery of the conservation program

The conservation priorities method

The conservation priorities method (the method) is a systematic and repeatable method for determining and prioritising new conservation lands. It combines detailed spatial information about biodiversity values with an analysis of planning and land use constraint data to assess the feasibility of implementing conservation lands as commitments under the Plan. A brief technical explanation of the method is provided in Appendix D. Conservation Priorities Method (page 141).

Application of the method produces a map of the Plan's strategic conservation area. This includes all areas that have the potential to directly offset impacts on threatened ecological communities, species and their habitats from development in the nominated areas and major infrastructure corridors. They represent large remnants of native vegetation with good connectivity, or areas with the potential to enhance connectivity on low- to medium-constraint land.

Table 2: Conservation priorities method - overview

Stage	Priorities
Stage 1: Ecological assessment	The first stage identifies areas of highest biodiversity value based on vegetation patch size, legislative status and condition within the Plan Area. This stage includes Phase '0', an exclusion process that identifies constraints not likely to support conservation, either due to the site already being protected or because the current (or proposed) land use is not consistent with a biodiversity offset outcome. This process reduces the amount of land of high biodiversity value available for conservation under the Plan. Offset requirements are determined with the help of a matrix that applies an offset ratio to all impacted entities based on their conservation status and condition. In accordance with the matrix, the offset ratio increases both as conservation significance increases and as the condition of vegetation improves.
Stage 2: Constraints assessment	The remaining vegetation and species habitat available for potential offset is assessed for further constraints that could challenge the implementation of conservation lands.
Stage 3: Conservation priorities assessment and offset selection method	This stage identifies suitable conservation areas based on the outputs of stages 1 and 2, and using an offset area selection approach (noting that the selection of suitable offset areas is done from the 'ground up'; that is, from PCT and threatened species habitat to the landscape scale).
Stage 4: Ground-truthing program	Suitable conservation areas are ground-truthed to confirm their validity and robustness and to identify the biodiversity values present. Areas confirmed to have relevant biodiversity values present and are deemed suitable as offset sites will be prioritised under the Plan's conservation program. The next stage for these sites will be to develop comprehensive implementation proposals in collaboration with delivery partners and affected stakeholders.

The strategic conservation area

The strategic conservation area represents habitat that is of regional significance to biodiversity and that provides the best opportunities to deliver biodiversity outcomes and support the Cumberland subregion's ecological function.

Approximately 28,300 hectares of the Plan Area has been identified and mapped as strategic conservation area (see Figure 8). This area contains native vegetation, classified into plant community types, including habitat for 49 threatened flora and fauna species and 8 BC Act- and/or

EPBC Act-listed threatened ecological communities s that may be impacted by development facilitated by the Plan.

The strategic conservation area will be used to identify and prioritise suitable conservation lands as offsets for biodiversity impacts over the life of the Plan. Suitable areas may be protected as a future reserve or biodiversity stewardship site or enhanced through an ecological restoration project to deliver the Plan's offset targets for affected native vegetation communities.

Planning controls will be applied across the strategic conservation area, except for land owned by Local Aboriginal Land Councils (LALCs) or under claim by LALCs. Deerubbin owned land has been excluded from the strategic conservation area at their request. Other LALC owned land and land under claim represents 1,700 ha of the 28,300 ha strategic conservation area.

Not all of the mapped strategic conservation area will be established as conservation land under the Plan. However, it is estimated that around double the amount of land will need to be protected to meet our offset target of 5,475 hectares of native vegetation. This larger area includes non-target vegetation communities, cleared areas to accommodate recreational and visitor facilities, and lots that may be needed to meet boundary configurations necessary for efficient management of a public reserve or national park.

New conservation lands will be acquired on a voluntary basis, in consultation with landowners. Compulsory acquisition is proposed to be used in limited circumstances to acquire land that is critical for creating a proposed conservation reserve when voluntary acquisition has not been otherwise successful. More details about this and how sites will be identified is provided in the sections on Expanding the reserve system to protect biodiversity in Western Sydney (page 42), Biodiversity stewardship sites on private land (page 52) and Establishing conservation lands as offsets (see page 83).

Identifying suitable conservation lands from the strategic conservation area will continue over the life of the Plan to ensure that potential sites are appropriate, can be implemented and are based on the best available information and data. This includes a review of the strategic conservation area mapping, in line with the five-yearly reports.

Data sources and iterations

The conservation priorities method (Appendix D. Conservation Priorities Method) used different datasets to generate the strategic conservation area. These included the best available vegetation mapping and other existing NSW and Commonwealth datasets. New threatened species data was generated using several tools, including on-ground surveys, habitat mapping, distribution modelling and knowledge-based models.

The method was independently peer reviewed, as required by the terms of reference for the strategic assessment. The review (in the Assessment Report) found the conservation priorities method to be robust and that datasets were appropriate, consistently applied across the Plan Area, and comprised the most up-to-date information on biodiversity values, development and land use. Ongoing application of the method, using up-to-date information on biodiversity, constraints and opportunities can continue to deliver robust data to support the development of detailed implementation planning, decision-making and prioritisation for conserving biodiversity and restoring ecosystems in Western Sydney.

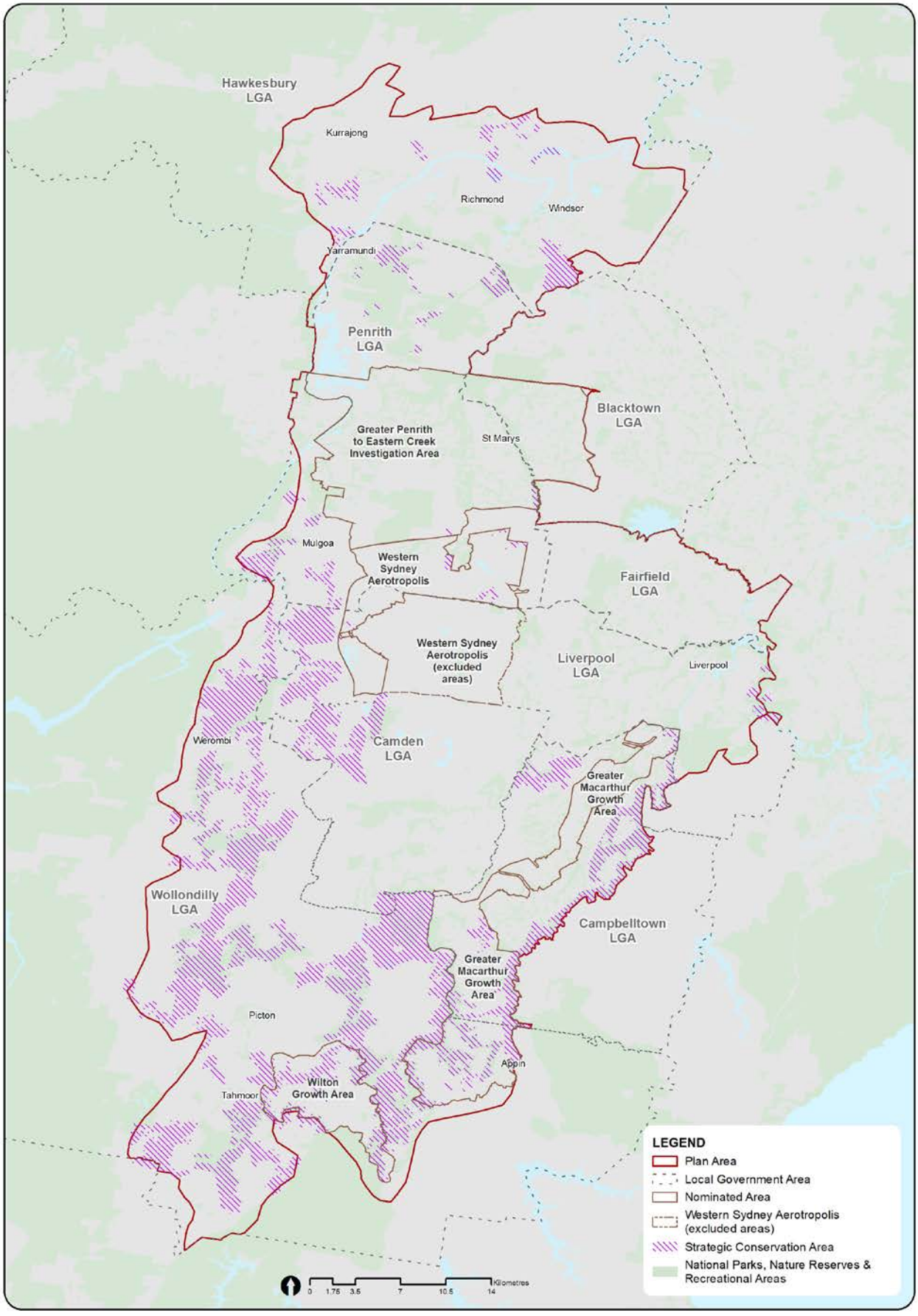


Figure 8: The strategic conservation area

Avoiding and minimising impacts

Avoiding and minimising impacts highlights:

- Avoid impacts on at least 4,315 hectares of land in the nominated areas, which includes avoidance targets for BC Act and EPBC Act-listed threatened ecological communities
- Apply environment conservation zoning to all areas avoided for biodiversity purposes and other environmental purposes.

Avoiding impacts on biodiversity in nominated areas

Avoided land describes the area which has been avoided from the certified-urban capable land in the nominated areas due to its high biodiversity value or for other environmental reasons. Avoiding impacts on biodiversity arising from development is the first step in minimising impacts required under NSW and Commonwealth biodiversity legislation. The 'avoidance criteria' used to identify areas to avoid are listed in Appendix B. Avoidance criteria.

Across the four areas this amounts to at least 4,795 hectares of native vegetation, made up of BC Act and EPBC Act threatened ecological communities, riparian corridors and steep slopes.

Figure 9 to Figure 12 are draft maps that identify the land categories in each nominated area. These include:

- land avoided from development due to biodiversity value or other environmental purposes (including riparian corridors or steep slopes).
- Certified-urban capable land, which will be subject to strategic biodiversity certification for development under Part 8 of the BC Act and strategic assessment approval under the Commonwealth EPBC Act
- areas excluded from the Plan's approval including those:
    - already developed
    - for which required approvals are already in place
    - where a development application has been submitted.

While only the certified-urban capable land will receive strategic biodiversity certification under the BC Act, the NSW Government recognises that additional, essential infrastructure development may be needed outside these areas to support growth over the next four decades and beyond. In recognition of this, the Plan's avoidance commitment (Commitment 2) has been reduced by 10% of the total area of avoided land to become 4,315 hectares of land avoided from development. This, however, doesn't alter the proposed environmental conservation zoning to all areas avoided for biodiversity purposes and other environmental purposes.

The avoidance target of 4,315 hectares comprises up to:

- 2,735 hectares of native vegetation avoided for its biodiversity value
- 935 hectares of native vegetation avoided for other purposes including riparian corridors and steep slopes

These targets include avoiding up to the following areas of BC Act- and EPBC Act-listed threatened ecological communities:

- 1,945 hectares of Shale Sandstone Transition Forest (EPBC Act)
- 2,135 hectares of Shale Sandstone Transition Forest (BC Act)
- 95 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (EPBC Act)
- 475 hectares of Cumberland Plain Woodland (BC Act)
- 170 hectares of River-Flat Eucalypt Forest (BC Act)
- 30 hectares of Coastal Swamp Oak (Casuarina glauca) Forest (EPBC Act)
- 90 hectares of Swamp Oak Floodplain Forest (BC Act)
- 30 hectares of Shale Gravel Transition Forest.

Any development outside of the certified-urban capable land will need to comply with the 'Appendix A. Guidelines for essential infrastructure development' and obtain all required NSW biodiversity approvals. This includes specific requirements to avoid, mitigate and offset impacts to MNES and other relevant EPBC Act matters such as:

- limiting cumulative direct impacts over the life of the Plan from essential infrastructure to Shale Sandstone Transition Forest within non-certified land to no more than:
    - 20 hectares in the Wilton Growth Area
    - 20 hectares in the Greater Macarthur Growth Area

The department will be responsible for notifying public authorities of their obligations under the Plan, monitoring the impacts of development and monitoring compliance with avoidance, mitigation and offset commitments under the Plan.

Planning controls to support avoidance

The department is proposing to introduce the following planning controls to protect biodiversity values on these avoided lands:

- environmental conservation zoning to protect biodiversity, riparian corridors and steep slopes
- a Ministerial Direction under section 9.1 of the *Environmental Planning and Assessment Act 1979* (NSW) to protect avoided land from rezoning
- a requirement that zoning in precinct plans is consistent with the areas of certified, urban-capable land, and protects avoided land identified in the Plan
- guidelines relating to essential infrastructure development by public authorities on non-certified land (including avoided land) in the nominated areas
- a requirement for precinct plans to have asset protection zones wholly within the certified, urban-capable land.

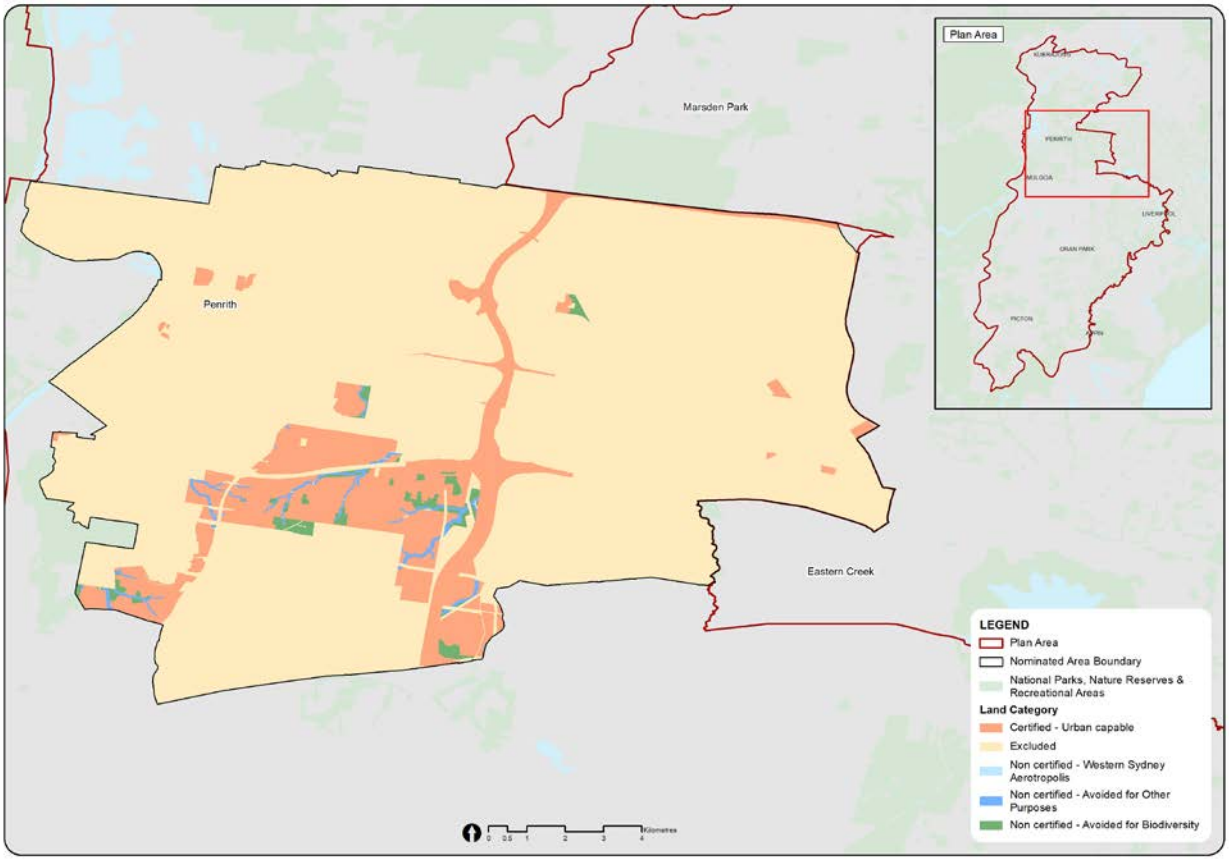


Figure 9: Greater Penrith to Eastern Creek Urban Release Investigation Area land categories

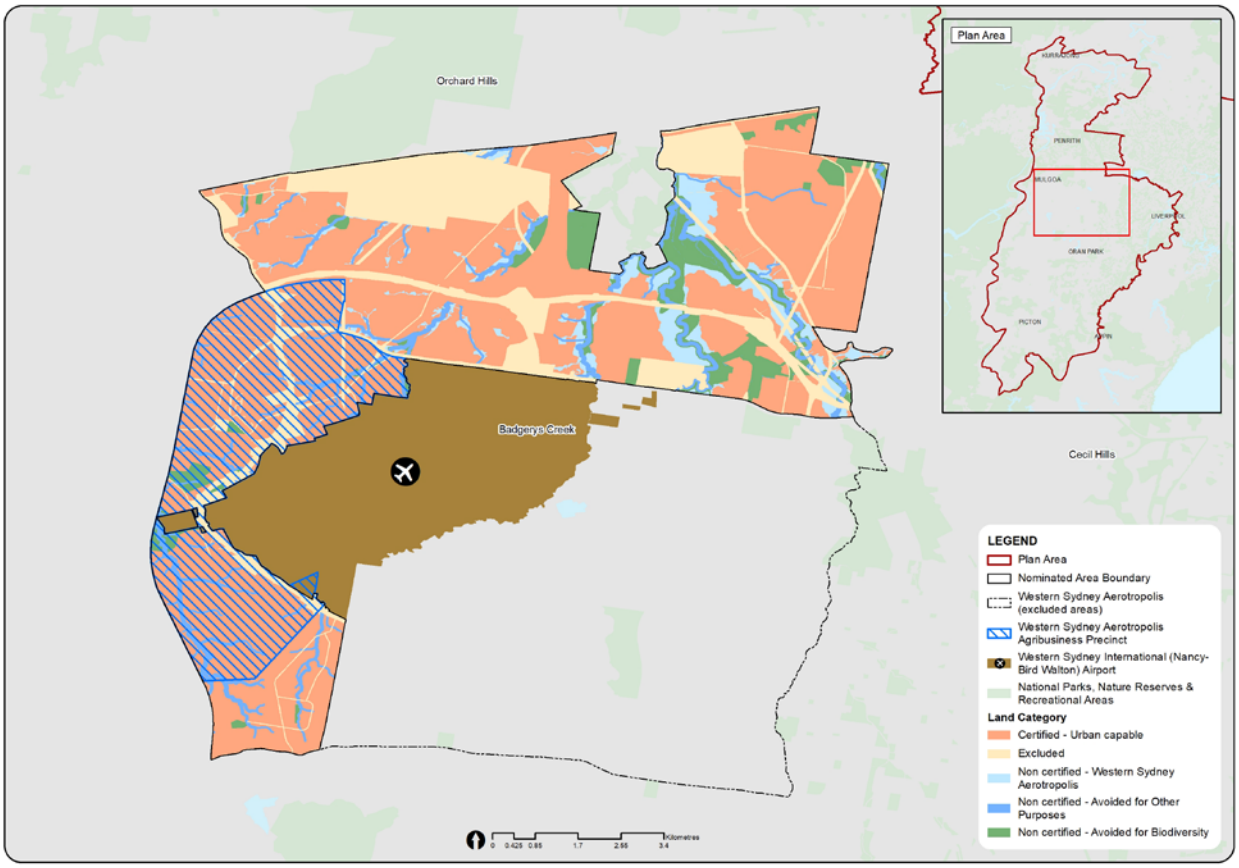


Figure 10: Western Sydney Aerotropolis land categories

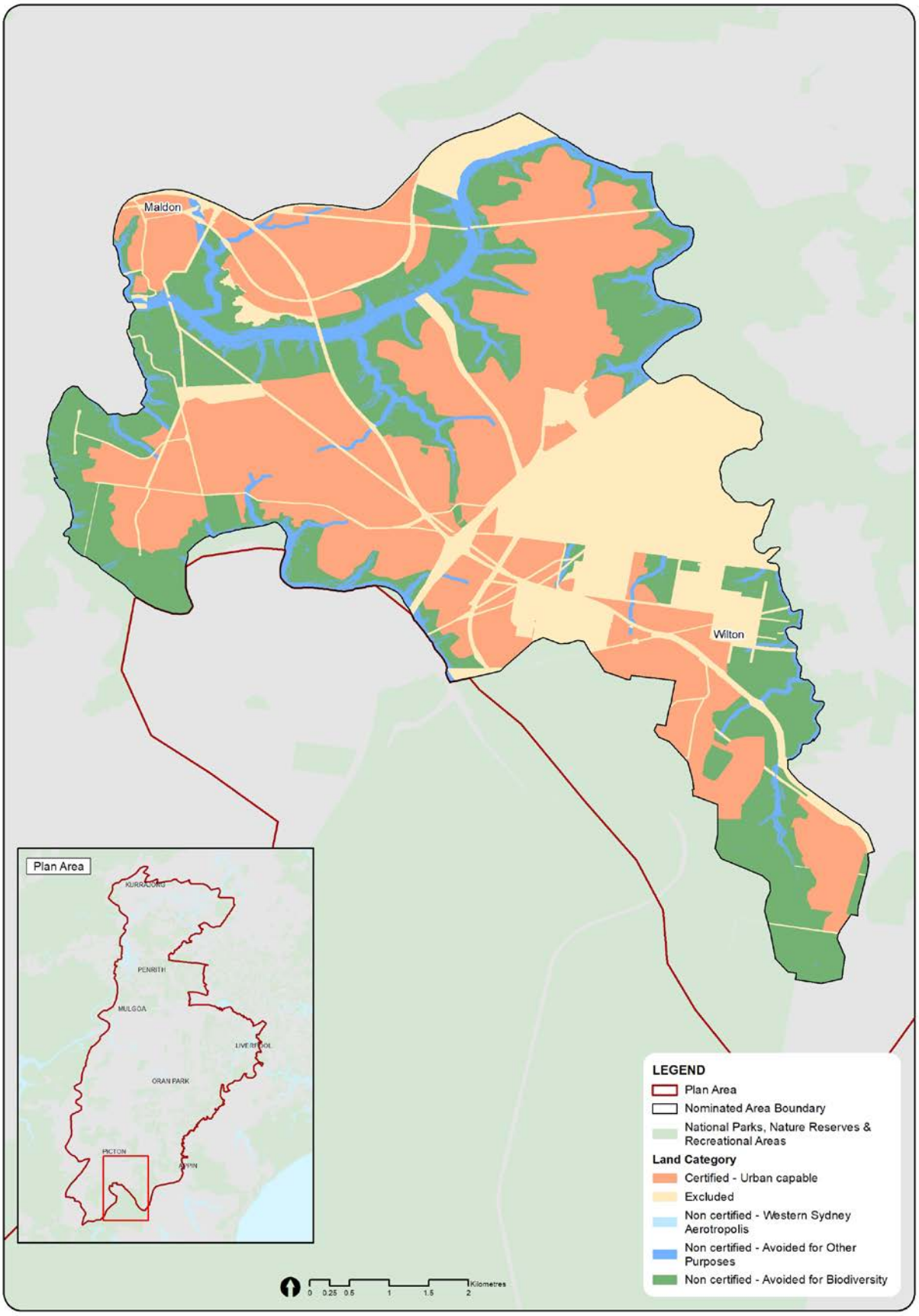


Figure 11: Wilton Growth Area land categories

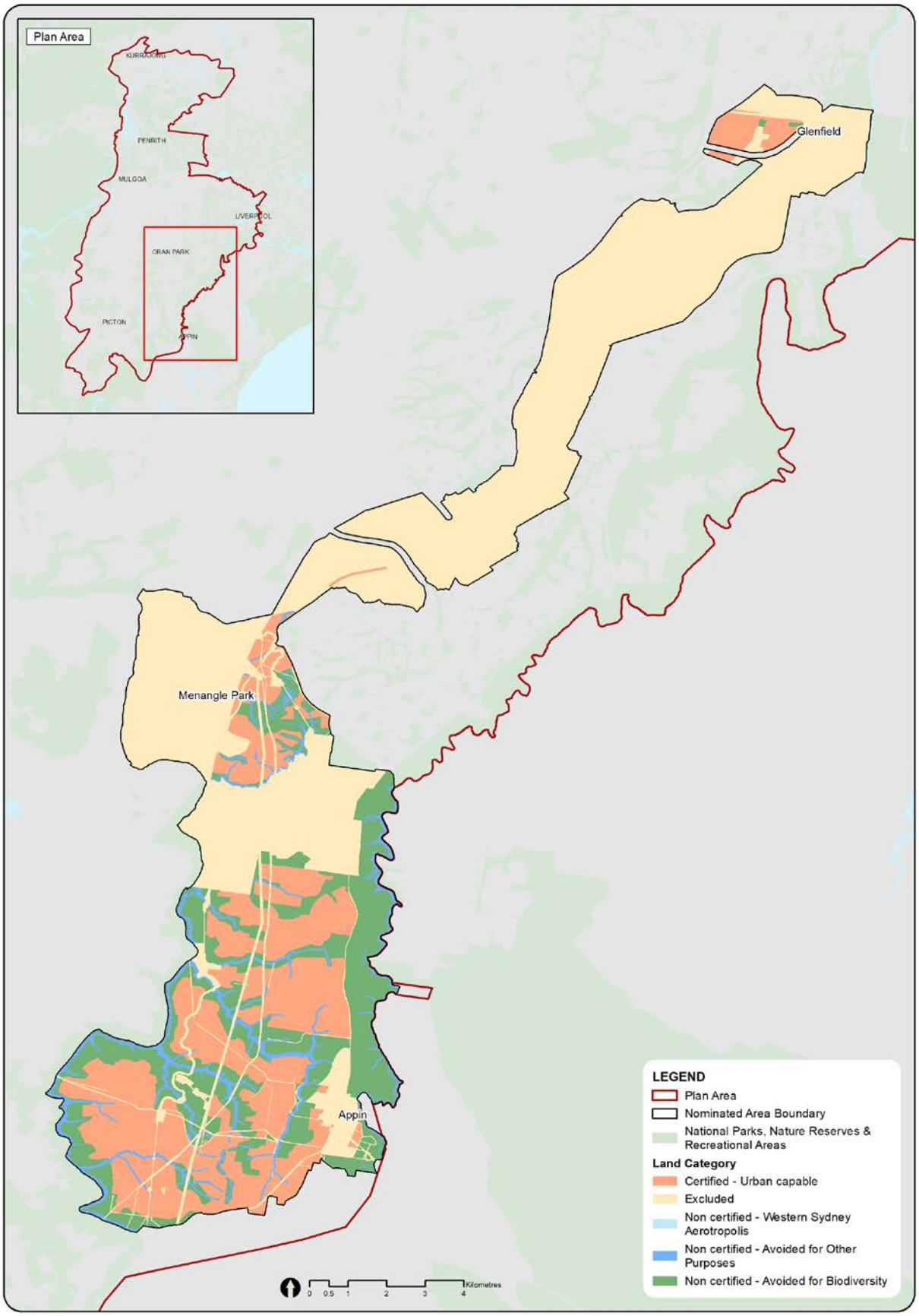


Figure 12: Greater Macarthur Growth Area land categories

Environmental conservation zoning for avoided land

Environmental conservation (E2) zoning will protect or manage land of important environmental value. An environmental zoning can be applied to private or public land where the primary focus for that land is the conservation and/or management of environmental values. Zoning sets out objectives that the consent authority must consider, as well as the land uses that are permissible and prohibited.

Environmental conservation zones will be applied in nominated areas to protect lands with high biodiversity value. This includes areas avoided for biodiversity purposes or that have other environmental constraints, such as riparian corridors or steep slopes. The exception will be for land that is owned by LALCs or under claim by LALCs (this applies to 90 hectares of the 4,795 hectares of avoided land.

The Explanation of Intended Effect for the proposed State Environmental Planning Policy (SEPP) provides more detail about the proposed environmental zoning within nominated areas.

Aligning precinct planning with biodiversity certified areas

Structure Plans or equivalent strategic plans will guide the development of precinct plans for each nominated area. Precinct plans will identify, on a finer scale, land uses, associated development and infrastructure while ensuring local level considerations. Considerations include locating new homes and employment centres close to public transport, shops and services, and retaining and enhancing a community's character.

Precinct plans will be consistent with the Plan's conservation outcomes. A proposed SEPP for strategic conservation planning will require that zoning of the structure plans and precinct plans is consistent with the certified, urban-capable land footprint and the Plan.

Asset protection zones

An asset protection zone is a buffer zone between a bushfire hazard and buildings or other infrastructure that needs to be protected. It is managed to minimise fuel loads and reduce potential radiant heat levels, flames, localised smoke and ember attack. The appropriate distance is based on vegetation type, slope and the nature of the development and is determined by the Rural Fire Service Standards for Asset Protection.

Due to the high impact of managing the land to reduce fire hazards, the asset protection zone is located within the urban-capable land in the nominated areas. As part of the subdivision design, the asset protection zone may include perimeter roads or parks and recreational areas.

The asset protection zone can also form a buffer between the biodiversity to the development. While part of the urbanised landscape, the asset protection zone acts as a buffer to the important vegetation that has been avoided from development and protected by environmental zoning.

Avoiding impacts on biodiversity in major infrastructure corridors

The Plan will require a future process to avoid and minimise impacts on areas of high biodiversity value in major infrastructure corridors described in the Plan. The primary method to avoid impacts is to locate actions away from areas of known or potential high biodiversity value. Where an action cannot feasibly or practically avoid impacts on an area of high biodiversity value, the Plan will require that these impacts are minimised as far as possible (see Commitments 3 and 4).

To do this, Transport for NSW will consider how to avoid areas of high biodiversity value including habitat for identified species during the strategic planning phase of the project to understand potential impacts.

For the infrastructure corridors within nominated areas, which are to be strategically biodiversity certified under the Plan, the Plan's avoidance criteria (see Appendix B. Avoidance criteria) will be applied, including specific consideration of five threatened species determined by the Assessment Report and identified in Commitment 3.

Transport for NSW will be required to report to the department and executive implementation committee on development impacts and adjustments identified through the NSW State Significant Infrastructure approvals process (or equivalent) for each transport project. This will include specific reporting on avoidance achieved, within the mapped or protected corridors identified in this Plan.

The department will use this information to track impacts and adjust offset requirements through the Plan's reconciliation accounting process. Adjustments to the Plan's projected impacts to biodiversity (including Matters of National Environmental Significance) and offset requirements will be published through the Plan's annual updates and five-yearly independent reviews. Where areas have been avoided for biodiversity purposes, the department would look to apply planning controls, such as environmental conservation zoning.

For the infrastructure corridors outside the nominated areas, the requirement for avoidance would be identified through the BC Act Biodiversity Assessment Method, utilising the Biodiversity Certification Assessment Report or Biodiversity Development Assessment Report, in addition to specific consideration of biodiversity values and specific sites, including Commonwealth land, as determined by the Assessment Report and identified in Commitment 4.

Mitigating indirect and prescribed impacts

Mitigating indirect and prescribed impacts highlights:

Mitigate indirect and prescribed impacts from urban and transport development on threatened ecological communities, species and their habitats using best-practice standards, by:

- developing a set of development controls to mitigate indirect and prescribed impacts on biodiversity in the nominated areas and incorporating in the development control plans (DCPs) for each nominated area
- providing support to councils in applying DCP controls and sharing knowledge, maps and data
- installing koala-exclusion fencing between important koala habitat and the certified, urban-capable land to protect koalas near urban areas
- implementing impact mitigation measures based on the outcomes of environmental assessment of detailed infrastructure corridor designs

The development of the nominated areas and major infrastructure corridors will have indirect or prescribed impacts in addition to the direct impacts to biodiversity from clearing native vegetation. Indirect impacts are defined as those occurring beyond certified-urban capable land from vegetation clearing and changes in land-use patterns.

Prescribed impacts are impacts on biodiversity values that do not comprise direct clearing of native vegetation and are listed in clause 6.1 of the Biodiversity Conservation Regulation 2017 (NSW).

Understanding and addressing indirect and prescribed impacts resulting from the development identified in the Plan is a requirement under the EPBC Act and the BC Act. The Assessment Report has assessed these potential impacts on biodiversity values.

Development controls to protect biodiversity

DCPs are prepared under section 3.43 of the *Environmental Planning and Assessment Act 1979* (NSW) and the Environmental Planning and Assessment Regulation 2000 (NSW). They provide detailed planning and design development controls and support statutory instruments such as local environmental plans and SEPPs.

The department will work with the relevant consent authorities to introduce development controls in DCPs to protect biodiversity, specific species and other key environmental features in urban development areas of the nominated areas.

Development controls are needed to mitigate against a range of indirect impacts associated with increased urbanisation and growth. Increased urbanisation in Western Sydney poses a suite of threats to local flora and fauna species, including habitat loss, fragmentation, increased disturbance, increased exposure to domestic animal attacks, vehicle strikes and exposure to chemical pollution.

Specific DCPs will be prepared for each relevant nominated area or controls may be integrated into existing local government DCPs where precincts require the use of existing DCPs. Case study 1 provides an overview of this process applied to the Wilton Growth Area.

Case study 1. Development controls for Wilton Growth Area

Overview

Mitigation controls were developed for risk and threats to biodiversity in Wilton using a scientifically grounded, species-based method. These were drafted as development controls and included in the comprehensive DCP to address threatened ecological communities, species and their habitats in the Wilton Growth Area.

Method

Threatened species and ecological communities in Wilton were identified using the Biodiversity Assessment Method. This work included on-ground surveys by ecologists, predictive habitat modelling and a process of expert review.

Threats and management measures for each species occurring in Wilton were sourced from NSW BioNet, a scientific, peer-reviewed platform supported by the NSW Government. Using this data, a list of common threats was prepared, eliminating repeated threats and combining those with similar management measures.

The list of threats and management measures were then synthesised into objectives and specific development controls specific for Wilton. The proposed objectives and development controls were then assessed in the threat matrix, showing how they mitigate biodiversity threats and providing an evidence-based process to ensure the threats identified have been addressed.

Development controls to address risks and threats

Biodiversity controls have been developed and directly integrated into the precinct planning process for Wilton growth area through the draft Wilton DCP. These controls inform the protection of biodiversity and address species and threatened ecological communities including both direct and indirect threats to biodiversity in Wilton growth area.

These Wilton specific objectives and controls were reviewed by council and are designed to improve biodiversity outcomes, guide neighbourhood planning and minimise indirect and prescribed impacts in the Wilton Growth Area.

Two broad types of development controls will be implemented.

General environmental controls that will benefit the environment, including biodiversity values. These controls are typically standard controls implemented by councils in NSW to manage the impacts of development on the environment through the development application process.

Specific controls that apply to specific species and threatened ecological communities (TECs) in specific locations or broader nominated areas. These controls have been identified through the Assessment Report and are needed to address residual risks to species or TECs that remain after implementation of the general environmental controls.

Considerations have included:

- design, siting and development for precinct design and subdivision
- threatened and significant species
- threatened ecological communities
- waterways and riparian corridors

The DCPs will set out development controls that need to be addressed by neighbourhood plans and development applications to mitigate indirect and prescribed impacts on threatened species. Controls to address specific biodiversity values, including threatened ecological communities and species are in Appendix E. Species and TEC-specific mitigation measures. The general environmental controls to be implemented are described in Chapter 15 of the Assessment Report.

In addition, the department will work with the relevant planning authority to:

- incorporate requirements to audit and monitor the implementation of development controls in the standard set of conditions in subdivision plans
- incorporate provisions in relevant land-use plans for the nominated areas to give legal effect to specific development standards as required.
- provide ongoing support to councils in the application of DCP controls within the nominated areas, including the sharing of knowledge, maps and data.

Mitigation measures for infrastructure activities

The department will establish guidelines that will include the mitigation measures for indirect and prescribed impacts to biodiversity from infrastructure activities, as described in Appendix E. Species and TEC-specific mitigation measures. These will need to be considered by the determining authority for certain activities including State Significant Development and projects assessed under Part 5 of the *Environment Planning and Assessment Act 2000.*

These will include for example, minimising the spread of weeds and other pathogens and minimising human disturbance to certain threatened species populations.

Mitigating impacts on the Southern Sydney koala population

Koalas are one of Australia's most iconic animals. However, their number and distribution has significantly declined in recent years. The Southern Sydney koala population is one of two known populations in the Cumberland subregion. It occurs within and near the Wilton and Greater Macarthur growth areas.

As land use changes in Western Sydney and the area becomes more urbanised, these koalas will be exposed to increasing threats, including habitat loss and fragmentation, domestic dog attacks, vehicle strikes, fire and climate change. To mitigate these impacts, the conservation program will install koala-exclusion fencing between important koala habitat and the certified, urban-capable land to protect koalas near urban areas. Exclusion fencing will separate koalas from future urbanised areas in the Wilton and Greater Macarthur growth areas and will be installed on both sides of Appin Road to protect koalas from vehicle strike.

In some circumstances, exclusion fencing may not be suitable due to the land's topography, the existence of waterways or creeks, or the land being a heritage-listed area. In these areas, bespoke fencing will be considered. However, in cases where no fencing type is possible, controls will be developed according to the Koala Habitat Protection Guideline for 60 metres from the koala habitat, and design requirements included in the relevant development control

These actions are detailed in *Sub-Plan B: Koalas*.

Mitigating impacts from major infrastructure corridors

The construction and operation of major infrastructure corridors could have indirect and prescribed impacts on biodiversity. Sub-Plan A has identified several actions for mitigating these impacts and addressing risk.

Mitigation includes applying mitigation or safeguard measures that are detailed during the environmental impact assessment process and undertaken during construction and operation.

Transport for NSW will assess the impacts on biodiversity and other environmental values based on detailed design and implement mitigation measures, in accordance with published, best-practice guidelines, including but not limited to, the *Biodiversity Guidelines* (2011).

In addition, Transport for NSW will be required to undertake ongoing monitoring of high-value environmental areas, and review and adjust mitigation measures (where practical) in response to monitoring outcomes.

The assessment report has identified specific recommendations to manage and mitigate indirect and prescribed impacts from the operation and construction of major infrastructure corridors. These are also listed in Appendix E. Specific mitigation measures to address residual risk.

Conserving flora, fauna and associated habitat

Conserving flora, fauna and associated habitat highlights:

- Protect a minimum of 5,465 hectares of impacted native vegetation within new conservation lands to conserve biodiversity values in perpetuity. More than double this area will likely be protected through the conservation program.
- Undertake up to 1,365 hectares of ecological restoration of threatened ecological communities (TECs), achieving up to 25% of the conservation target for native vegetation
- Establish the Georges River Koala Reserve by protecting and managing up to 1,885 hectares of important koala habitat (including ecological restoration) along the south-eastern edge of the Cumberland subregion.

This category of commitments is focused on securing new conservation lands to protect biodiversity in perpetuity through a network of protected private and public restored bushland across the Cumberland subregion.

New conservation lands, or additions to lands, will comprise new national parks, council- or community-based biodiversity reserves, and biodiversity stewardship sites on public or private land. These commitments will account for at least 90% of conservation program funding over the life of the Plan.

The NSW Government has identified three reserve areas within the Plan Area as being critical to the protection of NSW and Commonwealth TECs and species, and to enhance ecological connectivity across the landscape to protect biodiversity. These areas are the Georges River Koala Reserve, announced as part of the Plan, and two additional public reserves under investigation for feasibility:

- Gulguer Reserve Investigation Area
- The Confluence Reserve Investigation Area.

The Plan will prioritise funding for conservation of these three reserve areas in the first five years of implementation. This will include creating biodiversity stewardship sites on land currently owned by the NSW Government and on other land in these areas if and when they become available for acquisition.

In addition to these priority reserve areas, over the life of the Plan the broader conservation program will acquire land in other suitable reserve sites, invest in biodiversity stewardship sites on private land, and prioritise ecological restoration of native vegetation and habitat.

New conservation lands are integral to achieving the Plan's long-term environmental outcomes as larger remnants of vegetation communities are better able to support resilient populations of species and enhance connectivity. They are also less susceptible to 'edge effects', catastrophic events and the expected impacts of climate change (DECCW 2010). Evidence also indicates that biodiversity loss significantly increases once habitat fragmentation by clearing exceeds 70% of the landscape. This threshold is already surpassed in the Cumberland subregion (DECCW 2010).

Aside from their biodiversity value, conservation lands provide social and wellbeing benefits to local communities by increasing access to nature and green spaces, protecting heritage sites and contributing to the local economy through jobs and tourism. Therefore, a clear imperative for the Plan is to increase the protected area network and enhance ecological connectivity across the landscape.

New national parks and reserves will ensure the largest and most intact remnants of vegetation are protected in perpetuity. At the same time, conserving biodiversity on private land through stewardship agreements can expand the range of natural values that are protected. Developing a network of protected areas through small and large stepping-stone reserves and stewardship sites can provide buffers and corridors to improve landscape connectivity and build resilience to the impacts of climate change.

Ecological restoration will play a critical role in improving biodiversity outcomes by enhancing connectivity between remnant habitat patches and replacing some areas of over-cleared vegetation communities. It is expected that up to 25% of our conservation target could be realised through active restoration projects that will use bush regeneration and replanting to expand the area's native vegetation communities. This restoration will be focused on areas of suitable habitat where the existing vegetation has a Vegetation Integrity (VI) score[5] of less than 15.

New conservation lands will be selected from the Plan's strategic conservation area (see page 27). The department has developed conservation lands selection steps and principles to guide implementation decisions. These are described on page 85.

The department is developing a 'Conservation Lands Implementation Strategy' as a priority action to meet the commitment to secure 5,475 hectares of impacted native vegetation (Commitment 8, Action 1). The strategy will guide the investigation, acquisition and implementation of conservation lands identified through the Plan's strategic conservation planning over the life of the Plan. More detail on the strategy is provided on page 83.

The next three sections outline the Plan's approach to establishing and delivering:

- new or additions to existing reserves
- biodiversity stewardship sites
- ecological restoration of native vegetation and habitat.

Expanding the reserve system to protect biodiversity in Western Sydney

Over the life of the Plan, it is intended that around half of the target of 5,475 hectares of impacted native vegetation to be offset, will be protected and managed as part of an expanded reserve system (national parks system, council reserves and community reserves), including areas that may need to be restored to benchmark biodiversity conditions. To meet that target, much larger additions will be made to the reserve system. This is because a larger area of land is needed to secure the targeted threatened ecological communities, species and their habitats, to accommodate the development of compatible recreational and visitor facilities in public reserves and to meet the size and boundary configurations necessary for a reserve or national park.

Reserves can take many forms in NSW. Table 3 outlines the different types of reserves being considered under the Plan.

[5] A **vegetation integrity score** represents the degree to which the composition, structure and function of the **vegetation** at a site differs from the best-on-offer condition for the same **vegetation** type in the contemporary landscape

Table 3: Types of reserves proposed in the conservation program

Reserve type	Description	Manager
National park	A relatively large area of land, often with outstanding and representative ecosystems, and natural and cultural features. Apart from essential management and visitor facilities, it is preserved in its natural state.	National Parks and Wildlife Service (NPWS)
Nature reserve	An area protected and conserved for its unique or representative ecosystems, species, communities or other natural values. Typically, it has limited public access and facilities.	NPWS
State conservation area	A permanently reserved area that contains significant or representative ecosystems, landforms or natural phenomena, or places of cultural significance. Cultural values are also protected.	NPWS
Regional park	An area protected or conserved in a natural or modified landscape that is suitable for public recreation and enjoyment. A trust may be appointed to manage a regional park under the *National Parks and Wildlife Act 1974* (NSW).	NPWS
Council reserve	An area of land categorised as a 'natural area' within the 'community' classification of public land. Recognised as an area of local conservation significance that can complement and enhance the formal national parks system. Councils are generally responsible for funding the upkeep and management.	Council
Community-based reserve	A growing subset of the National Reserve System, standard mechanisms include either the donation of land or covenanting properties in a secure method that meets National Reserve System standards. The community group responsible for the land sources funds to manage it, including through grants and sponsorships.	Community

Reserve implementation

Land tenure across the Plan Area is mostly freehold, meaning land will be acquired for reserves from private landholders on a voluntary basis over time. Areas that are best protected through the national parks system will likely have a long implementation phase to allow voluntary acquisition. Smaller reserves, or additions to existing reserves, may be easier to acquire and establish. The complexity of the acquisition process will depend on how many lots and landholders are involved in negotiations for each proposed reserve.

While the three reserve areas described earlier (see page 41) have been identified as a priority under the Plan, the department is preparing a 'Conservation Lands Implementation Strategy' to guide the selection of reserve sites over the life of the Plan. New reserve proposals will be developed in consultation with the National Parks and Wildlife Service and local councils, and through public engagement, where possible. Reserve sites will be chosen from the Plan's strategic conservation area, as these contain large remnants of native vegetation with good connectivity or are areas with the potential to enhance connectivity on low- to medium-constraint land. Reserve design principles from the *NSW National Parks Establishment Plan 2008-2018* (NPWS, 2008) and

the *Strategy for Australia's National Reserve System 2009-2030* (NRMMC, 2009) will also influence reserve proposals under the Plan.

New reserves may also be managed by local councils or non-government organisations or jointly managed with Local Aboriginal Land Councils. Council reserves and smaller community-managed reserves will be identified in consultation with the relevant delivery partner. These reserves are more suitable in areas that:

- provide a buffer to adjacent urban development
- provide habitat for iconic species (such as primary, secondary and tertiary corridors for koalas)
- present a strong opportunity to provide connectivity
- are not aligned with the size and boundary configuration needed for a larger reserve.

The most appropriate long-term land manager of a given reserve will be determined during the implementation of the Plan, with support from the National Parks and Wildlife Service and, if relevant, the local council. Designating a reserve type under the national parks system is considered in the final stages of the gazetting process and is led by the National Parks and Wildlife Service in consultation with relevant NSW Government agencies.

The department will work with the National Parks and Wildlife Service and Local Aboriginal Land Councils to investigate opportunities for Aboriginal communities to participate in joint management of new conservation reserves in the Plan Area (Commitment 22, Action 2).

Biodiversity Stewardship Agreements will be established over land acquired by the Office of Strategic Lands under the conservation program. The land will then be transferred (together with the Biodiversity Stewardship Agreements, title covenants and ongoing annual management payments) to a suitable long-term public land management authority such as the National Parks and Wildlife Service, local government, the Western Sydney Parklands Trust or an appropriate community-based organisation to ensure funding for ongoing active management of reserve sites is secured in perpetuity. The reserve establishment process is demonstrated in Fi.

Acquisition

The Office of Strategic Lands will be responsible for acquiring land for future reserves established under the Plan. The Office of Strategic Lands currently acquires land for a range of NSW Government programs, including those related to biodiversity, open spaces and new infrastructure. A formal contractual agreement between the department and the Office of Strategic Lands is being established to outline the arrangements that will govern the acquisition process, including roles and responsibilities, processes for implementation and progress reporting (Commitment 8, Action 6).

An acquisition framework is being developed to guide decision-making and the processes that will be used to acquire land for conservation (Commitment 8, Action 12). As part of this, the department will establish a community engagement program with landholders in the strategic conservation area to identify landholders interested in sale of land. (Commitment 11, Action 4)

It is proposed that all properties identified for acquisition by the Office of Strategic Lands be acquired through voluntary agreement (market purchase, property acquisition by agreement or active acquisition). Compulsory acquisition may be used in limited circumstances and only when voluntary methods have been unsuccessful and the Plan's adaptive management steps for offsets have been triggered (see page 89). In these cases, consultation with landholders and key stakeholders will be undertaken before any decision is made.

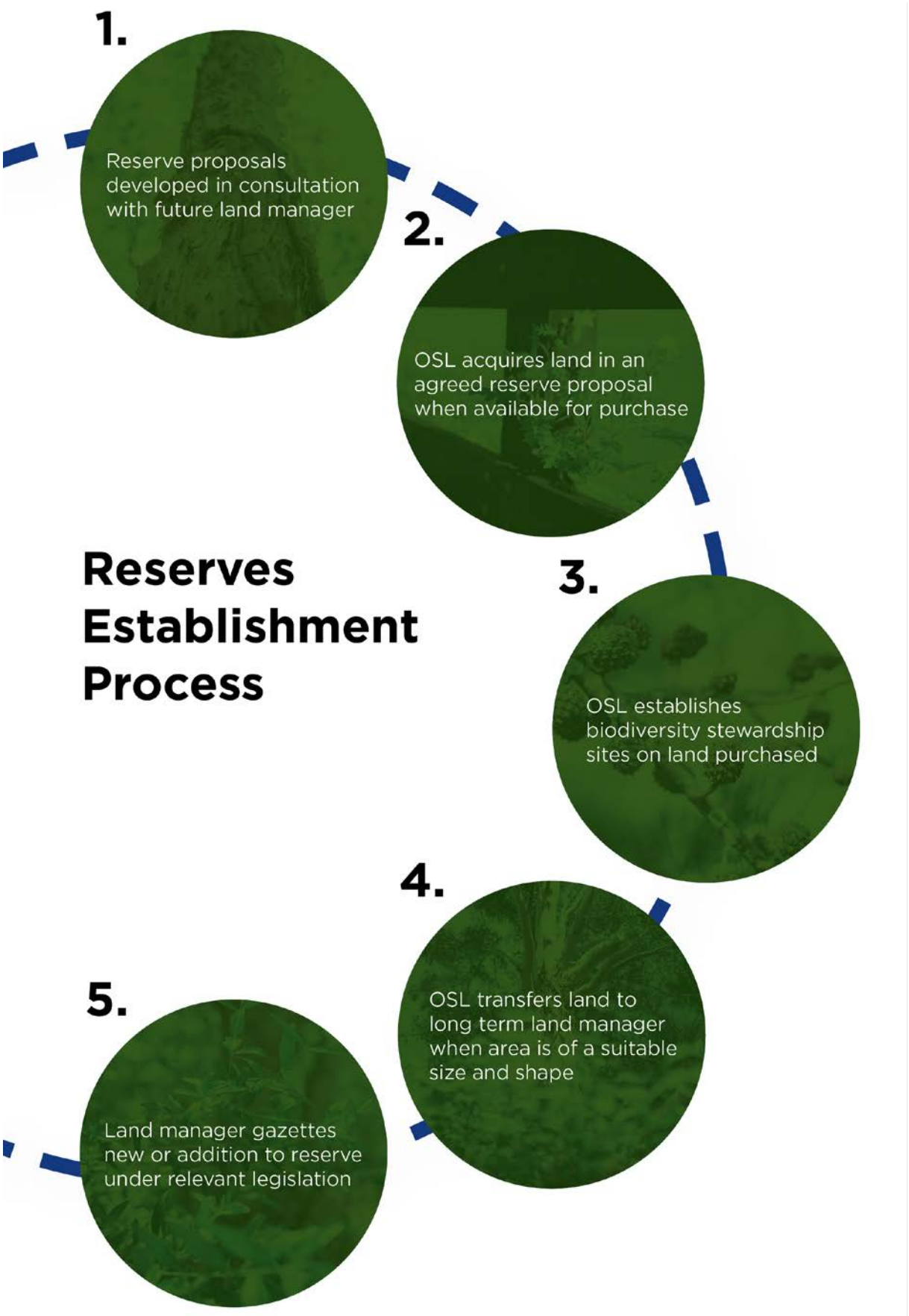


Figure 13: Process for establishing reserves through the Office of Strategic Lands

The department will apply acquisition clauses to land identified for future reserves under the Plan. These will be applied through the proposed SEPP for strategic conservation planning. Land will be identified every five years or as required, as funding becomes available and in accordance with the Plan's Conservation Lands Implementation Strategy.

The Establishing conservation lands as offsets section (see page 83) provides more detail on the department's proposed acquisition approach.

Staging the reserve program

An immediate priority of the Plan will be to secure Stage 1 of the Georges River Koala Reserve proposal, a key commitment to protect one of the area's most iconic species. Stage 1 of the reserve will be established by Year 10 of the Plan and will include approximately 1,130 hectares of important koala habitat between Appin and Kentlyn to secure the north–south koala corridor (see Case Study 2). Once established, this area will be gazetted as a reserve under National Parks and Wildlife Service management (Commitment 10, Action 3).

Stage 2 will comprise up to 755 hectares of additional land between Kentlyn and Long Point as future additions to the reserve (Commitment 10, Action 4). Sub-Plan B provides more details about this proposal and its implementation under the Plan.

In addition to the Georges River Koala Reserve, other priority sites include the Gulguer Reserve Investigation Area and the Confluence Investigation Area. Investigating the feasibility of establishing future reserves in these areas and investing in their protection will be a priority in the first five years of the Plan. The Gulguer Reserve Investigation Area could cover up to 1,800 hectares of land for target species protection and restoration in the southwest of the Cumberland subregion. The Confluence Reserve Investigation Area could protect up to 570 hectares in the north of the Plan Area. Other areas within the strategic conservation area have also been identified for further investigation as future reserves to provide greater landscape connectivity such as Bargo. These reserves will be vital to securing a large proportion of the Plan's strategic offsets early in the life of the Plan. However, the complete process to establish and gazette these new reserves under the *National Parks and Wildlife Services Act 1974* is unlikely to occur before Year 20 of the Plan.

Aside from establishing these priority reserves, it is proposed to begin acquiring smaller parcels of land from suitable sites within the first 10 years of the Plan and as they become available. For larger reserve proposals, the Plan's executive implementation committee will work with key delivery partners the National Parks and Wildlife Service, Office of Strategic Lands and local councils to identify and prioritise potential reserve sites; identify a staging approach for each reserve site; and undertake engagement with landholders and the community. This will be undertaken in a way that is consistent with the Conservation Lands Implementation Strategy. The proposed staging of reserves is outlined in Figure 14.

The department and key delivery partners (Office of Strategic Lands and National Parks and Wildlife Service) are developing formal agreements to guide the creation of reserves and ensure the Plan is on track to meet its commitments to secure and protect biodiversity in Western Sydney.

Ground-truthing of potential reserve sites will be completed in the first year of the Plan's implementation to ensure sites are suitable for offsetting requirements. Annual review of the Plan's progress and outcomes through an ongoing reconciliation accounting process (see page 88), will guide future efforts and strategy for land acquisition.

Should Aboriginal land claims exist on potential sites, reserve proposals will not proceed until the claim is resolved. The department will seek to have the determination of these land claims prioritised by the Crown Lands team for decision (Commitment 22).

Case study 2. Georges River Koala Reserve

The conservation program will establish the Georges River Koala Reserve, the most important north–south koala movement corridor along the Georges River between Appin and Kentlyn. The reserve will facilitate movement of koalas between Campbelltown and the Southern Highlands and promote the genetic diversity of the species. The establishment of the Georges River reserve was recognised in the Chief Scientist Koala Report (2020) as essential to the persistence of the Southern Sydney koala population. The reserve will protect and manage up to 1,885 hectares (including ecological restoration), which is three times the required offset target for important koala habitat for the Plan. The reserve will also give local communities accessible public space for recreation, such as walking, education opportunities and may provide opportunities for koala-based tourism.

Implementation

Stage 1 of the reserve includes approximately 1,130 hectares of land, which will be transitioned to a reserve in the first 10 years of the Plan. This land is along the upper Georges River between Appin and Kentlyn. The Office of Strategic Lands currently owns around 60% of the land within the proposed Stage 1 of the reserve and is in the process of creating stewardship sites on these parcels of land. Once agreements are in place, the biodiversity offsets credits that are generated will be sold to the department through the Plan to fund the ongoing management of the reserve.

Further acquisition of land is required to fill in gaps in the first stage of the Reserve. These lands, particularly along the western side of Appin Road will be the focus of restoration work to strengthen and widen the corridor. Consultation with affected landholders will occur throughout the early years of the Plan with the aim of gazetting Stage 1 of the reserve by Year 10 of the Plan.

Stage 2 will comprise up to 755 hectares of additional land to be incorporated into the reserve by 2040. Office of Strategic Lands has significant land holdings in this area; however, further land acquisition is required to complete the corridor. Some of this land is owned by local councils and Local Aboriginal Land Councils. The department will consult with these stakeholders before finalising the Plan, including giving them an opportunity to establish Biodiversity Stewardship Agreement over their lands.

When the land acquisition program is complete and Biodiversity Stewardship Agreements established, ownership and management of the reserve will be transferred to the NSW National Parks and Wildlife Service in accordance with the *National Parks and Wildlife Act 1974* (NSW).

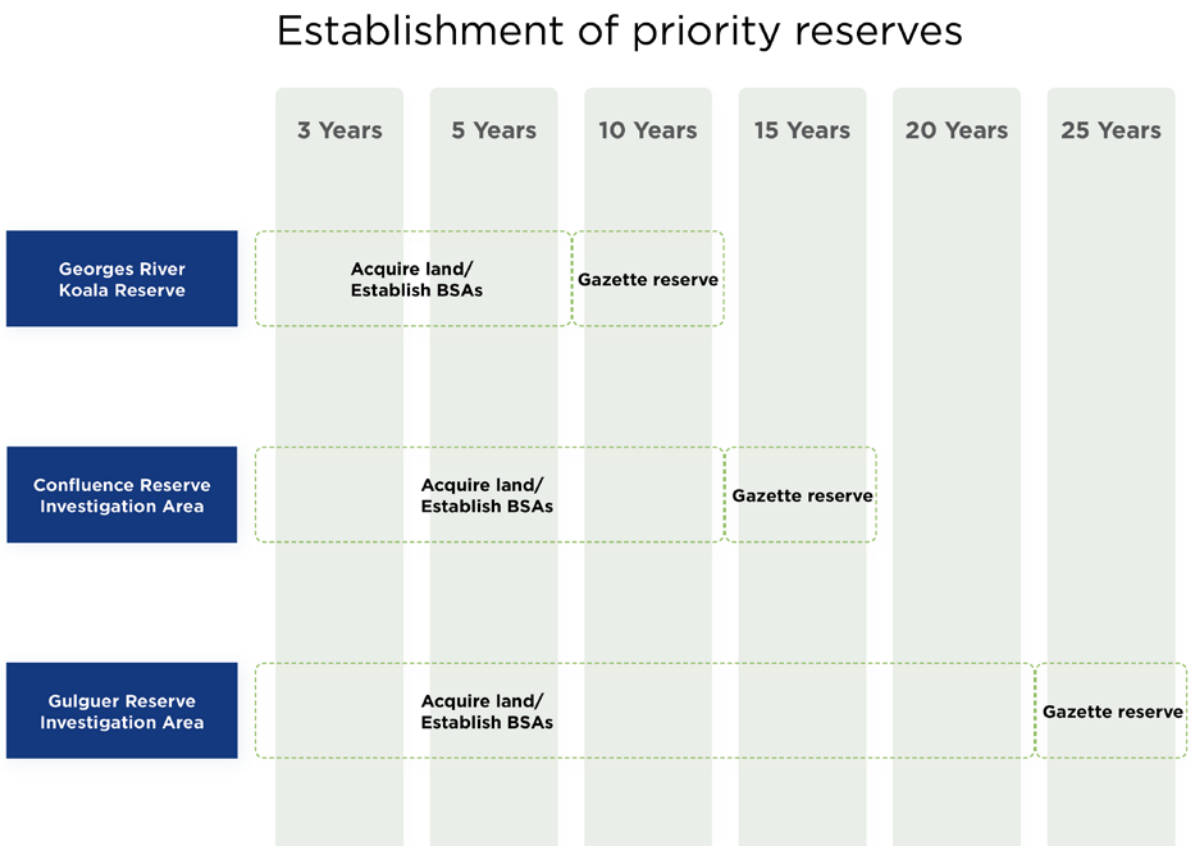


Figure 14: Proposed staging of the reserve program

Maximising connectivity across the landscape

The landscape within the Plan Area is highly fragmented. However, it remains an important area for many threatened and iconic species, including the koala, woodland birds and a range of other flora and fauna. Maximising connectivity across the landscape will improve biodiversity outcomes as it allows linkages between habitats, species, communities and ecological processes. This can improve genetic diversity, and the persistence and viability of threatened ecological communities and species.

Building connectivity is particularly important in over-cleared landscapes. Improving landscape connectivity in these areas enhances ecosystem resilience, providing a means to withstand ecological shocks such as drought, wildfire, floods, disease and anthropogenic climate change. It also provides connections to habitat refugia, which will become more important for plant and animal species as habitat conditions respond to climate change.

A viable network of protected areas on public and private land in Western Sydney will require:

- large enough remnants to continue to sustain populations of Cumberland subregion species.
- enough connectivity to allow fauna and seed movement between habitat patches
- refuge areas where species can avoid the worst consequences of major, unplanned events such as drought, fire or flood
- restoration to enhance key habitat components and connecting the best remaining remnants.

Securing key corridors across the landscape

The conservation priorities method (see Appendix D. Conservation Priorities Method), identified areas that represent large remnants of native vegetation with good connectivity, or areas with the potential to enhance connectivity on low- to medium-constraint land. The output of the method—the 'strategic conservation area'—covers approximately 28,300 hectares (14%) of the Plan Area.

These areas present opportunities for securing connectivity across multiple scales by connecting core areas of remnant native vegetation across the Plan Area. They also connect core areas within the Plan Area to adjacent, large protected areas, such as the complex of Blue Mountains national parks and Sydney catchment lands. In addition, they identify and prioritise the conservation of species-specific movement corridors, such as the north–south and east–west koala movement corridors in south western Sydney.

The highest priority for reservation as a national park would be comprised of mainly large parcels in critical areas for key habitat restoration or connectivity. Other areas critical for building a viable conservation network, may be suitable as either additions to the existing reserve network or conserved through biodiversity stewardship agreements. The final conservation type proposed will depend on the size of the lots, willingness of landholders to sell, or other significant challenges to protecting them for conservation.

The Georges River Koala Reserve is a key Plan commitment to secure the north–south koala movement corridor along the Georges River. The other two reserve investigation areas provide valuable opportunities to enhance connectivity in critical areas.

The Gulguer Reserve Investigation Area could provide an east–west corridor between existing protected lands in the Warragamba area. It aims to extend Gulguer Nature Reserve and Bents Basin State Conservation Area and connect them with the Burragorang State Conservation Area. This extended reserve would create an important biodiversity corridor and increase public access to green spaces that are currently heavily used.

The establishment of the Confluence Reserve, which would be located adjacent to the Windsor Downs Nature Reserve, would support the east–west corridor in the existing Londonderry reserve network, which additionally includes Agnes Banks, Wianamatta, and Castlereagh Nature Reserves. This proposal includes restoring up to 365 hectares of cleared land which would make it the largest restoration project within the Plan.

Figure 15 shows the location of the three reserve proposals which align with land that is already protected for conservation to demonstrate the potential for connectivity.

Other areas within the strategic conservation area have also been identified for further investigation as future reserves to provide greater landscape connectivity such as Bargo. Additional corridors will be identified from the Plan's strategic conservation area and prioritised through ground truthing. This will confirm native vegetation extent and condition in areas identified as potential habitat corridors. These may include east–west corridors, such as the Nepean River, and north–south corridors, such as Razorback Range and Allens Creek (see case study 3).

Case study 3. Nepean corridor and Razorback Range

The Nepean River riparian corridor and the Razorback Range comprise significant areas of remnant native vegetation, as the main areas of vegetation in the southern part of the Plan Area. These two corridors provide a vegetated link. They combine the forested areas in the catchment lands, the military reserve and Dharawal National Park between the Plan Area and the coastal escarpment across to the elevated landscapes of the southern Blue Mountains around Warragamba Dam.

The **Nepean Corridor** follows the gorge of the Nepean River and includes the shale-enriched upper slopes, steep sandstone cliffs, scarps, talus slope low in the valley and the rocky, pool-and-rapids riverine channel itself. The corridor supports a diverse range of open forest communities and the diverse landscape provides widely diverse habitats in a range of open forest communities and has steep sandstone slopes feature that provide crevices and caves.

Razorback Range consists of a steep-sided shale-dominated landscape. The slopes have enriched soils and often form to quite a depth. The sheltered southern side includes a number of sharp-sided gullies that form closed forests and in wetter spots hold small pockets of Western Sydney Dry Rainforest. The elevated landscape provides relief from the higher temperatures of the lowlands to the north, and the landform itself (being one of the higher parts of the landscape inland from the coast) intercepts the south easterly winds that carry moisture from the coast, resulting in a localised area of orogenic rainfall. This helps to maintain the moisture in the soil, the water available for wildlife and the ability of the vegetation to tolerate longer dry periods.

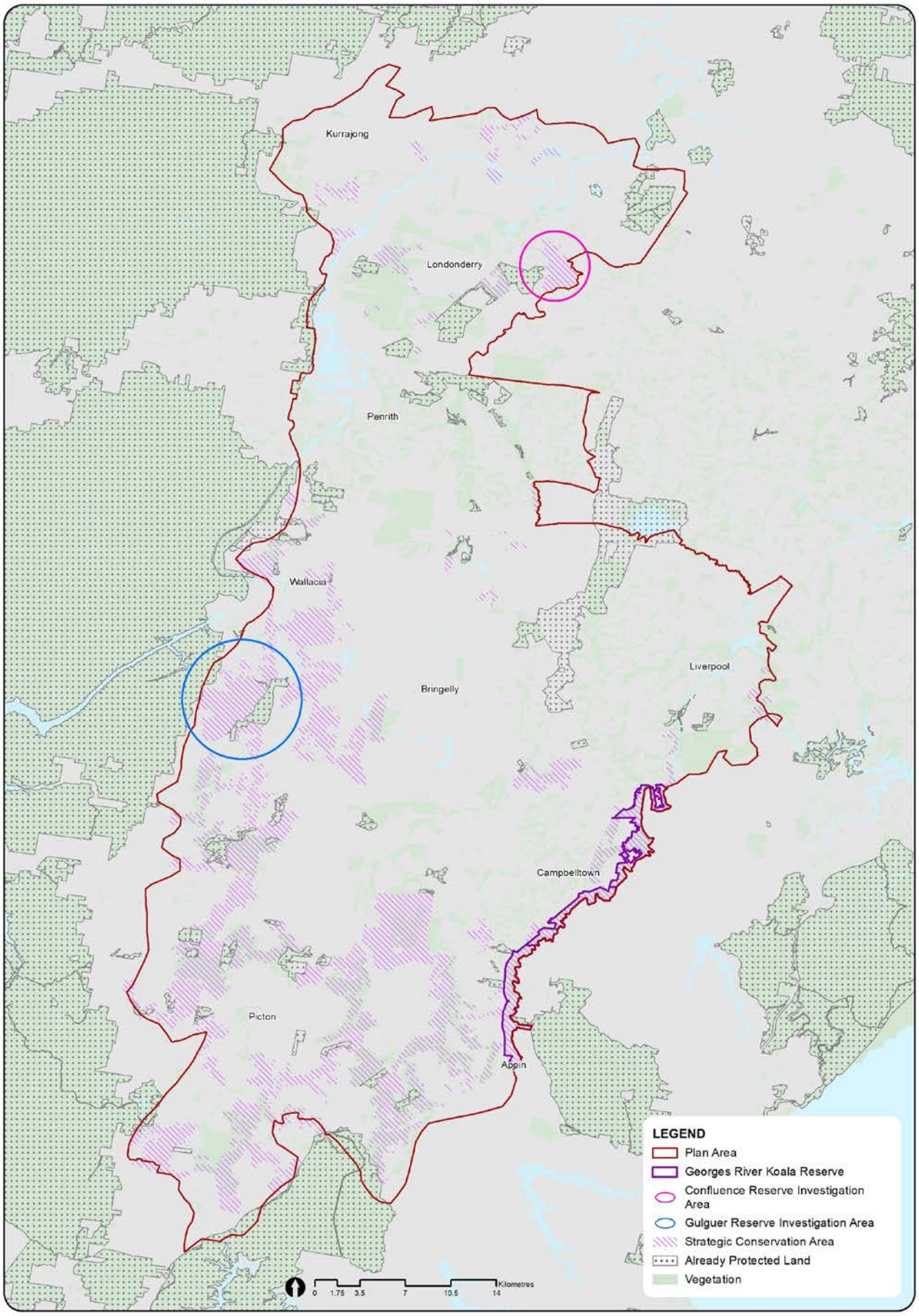


Figure 15: The proposed reserve investigation areas within the strategic conservation area

Biodiversity stewardship sites on private land

A biodiversity stewardship agreement is a cooperative agreement between a landholder and the NSW Government to establish a biodiversity stewardship site on their land. The landholder voluntarily enters into the agreement and manages the area in accordance with an agreed management plan. A biodiversity stewardship agreement is registered on the title of the property and provides in-perpetuity protection of the site's biodiversity values, with a secure, ongoing funding source.

Stewardship agreements are an important mechanism to support Western Sydney's biodiversity and growth over the long term as greater than 75% of the remaining native vegetation within the Cumberland subregion is privately owned (Open Lines 2020).

Establishing biodiversity stewardship sites on private land is particularly useful when the land is characterised by fragmented patterns of ownership (such as in the Plan Area). Managing conservation lands as stewardship sites can offer opportunities to expand the range of natural values that are protected while providing buffers and corridors to already protected areas (see case study 4).

As well as supporting the conservation of Western Sydney's biodiversity, stewardship agreements give landholders an opportunity to generate an income through trading biodiversity credits. Credits are generated by the expected improvement in biodiversity under management at the site.

Over the life of the Plan, the NSW Government expects around half of the 5,475 hectares targeted will be protected and actively managed through stewardship agreements. As for reserves, stewardship sites will be selected from the Plan's strategic conservation area.

The department acknowledges that in some cases it may be challenging to meet some of the conservation targets in the Plan as many of the targeted communities and species have limited extent or habitat remaining in the Plan Area. Rather than committing to a reduced offset target, the Plan allows for flexibility in reaching those targets through the conservation lands selection steps. This includes the opportunity to establish biodiversity stewardship sites or purchase of credits from outside the Plan Area, where offset sites within the Plan Area are not available. The conservation lands selection steps and overarching implementation principles are detailed on page 85.

Implementation of biodiversity stewardship sites

The establishment of biodiversity stewardship agreements is demonstrated in Figure 16. Unlike reserves, it will not be necessary to acquire land to establish stewardship sites. Landholders wishing to enter into an agreement can generate biodiversity credits and earn an income from trading these credits under the Plan. A biodiversity stewardship agreement does not need to cover all land held by a landholder. They can set aside a portion of their property to manage for biodiversity.

If a landholder decides to establish a stewardship site, the land must first be assessed by a person with Biodiversity Assessment Method accreditation. If approved, a biodiversity stewardship agreement is registered on the land title and accompanied by a management plan setting out the agreed initial and recurrent management actions.

A formal agreement with the Biodiversity Conservation Trust, the NSW Government agency established under the BC Act to deliver offsets, is being put in place to establish stewardship agreements under the Plan. This agreement will outline various arrangements, including a governance framework and the steps that will guide investment decisions for stewardship sites under the Plan.

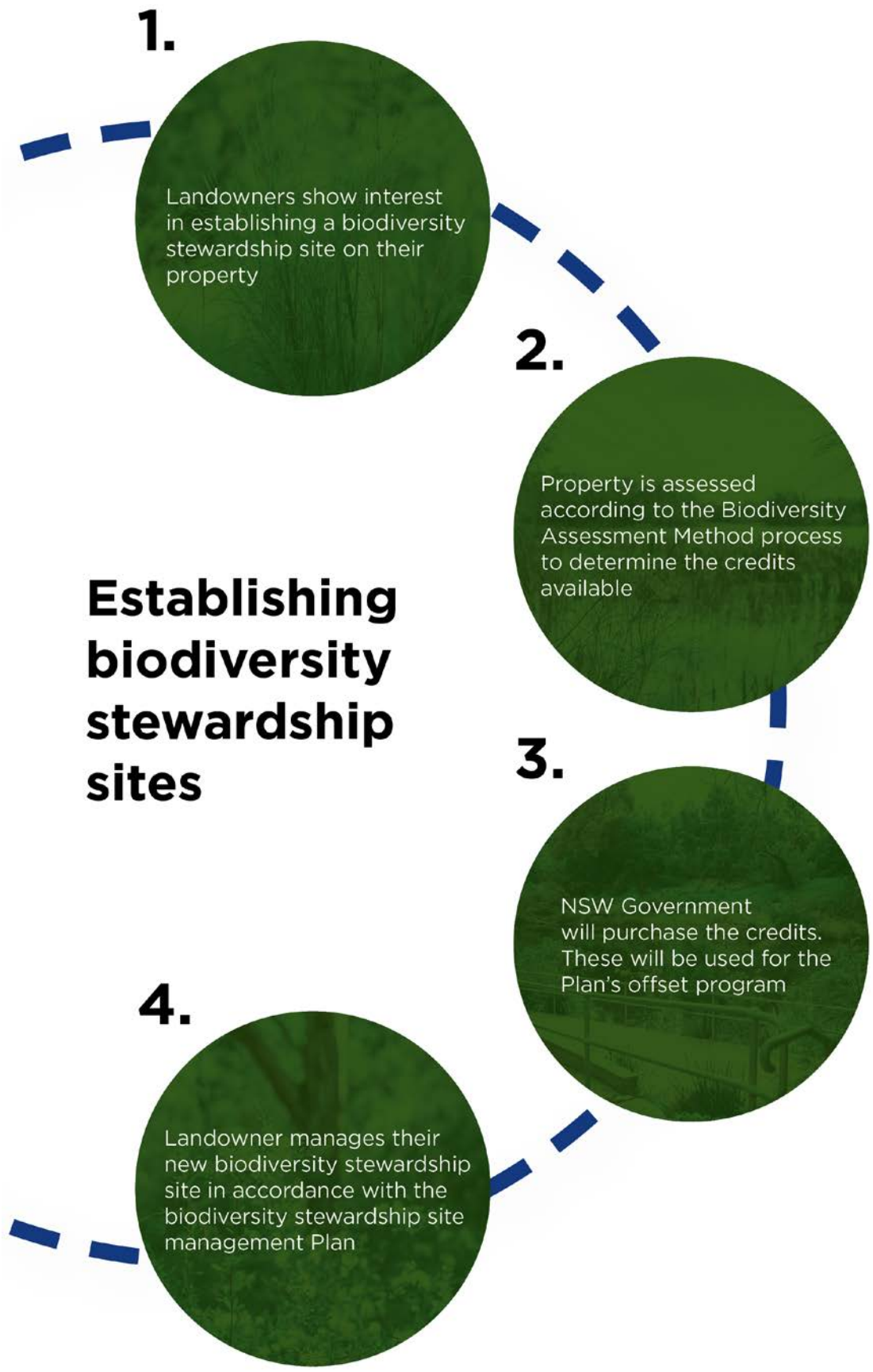


Figure 16: The process of establishing a biodiversity stewardship agreement

The department and the Biodiversity Conservation Trust will establish a community engagement program to promote the opportunities and benefits of stewardship sites to landholders in the strategic conservation area (Commitment 8, Action 10). The department is also proposing to fund upfront assessments for landholders wishing to enter into an agreement, where this investment can be recouped through the later sale of biodiversity credits (Commitment 8, Action 11).

Ground truthing of the Plan's strategic conservation area will be carried out in the first three years to ensure any potential Biodiversity Stewardship Agreement sites meet offsetting requirements. Periodic review of the Plan's progress will continue to inform future efforts and strategy for selecting and establishing stewardship sites.

Case study 4. A focus on the Razorback area

The Razorback area is located north of Picton and south of Theresa Park, with Orangeville and Spring Creek to the west, and Camden Park to the east (see Figure 17). The area has several features that make it appealing for conservation through biodiversity stewardship agreement, such as:

- its proximity to already protected land, including the Blue Mountains World Heritage Area and Burragorang State Conservation Area
- its suitability for an east–west corridor linking important koala habitat to protected land
- its suitability for a north–south corridor linking Gulguer and Tahmoor
- its suitability for BIO Map cores and corridors
- it contains several medium to large biobanking sites.

There is an opportunity to connect vegetation patches in the landscape in the Razorback area, providing a broader regional corridor. Establishing stewardship agreements in this area would strengthen the east–west corridor and reinforce a link to primary and secondary koala habitat in the south-east of the Plan Area. Several threatened fauna species have been identified within the area, including the koala, Cumberland Plain land snail and the Swift Parrot.

This area is quite removed from the proposed urban development and is not a priority area for planned growth. The land includes a high proportion of private ownership, which presents opportunities for landholders to benefit financially. The primary land uses in the area are grazing of native vegetation and modified pasture; limited cropping; and for residential and farming infrastructure.

Vegetation

Several important flora species are present in this area, including *Pimelea spicata* and *Cynanchum elegans*. The area is dominated by Moist Shale Woodland (PCT 830), Cumberland Plain Woodland (PCT 850) and Western Sydney Dry Rainforest (PCT 877). Smaller areas of PCT 835 (equivalent to River-Flat Eucalypt Forest), a NSW threatened ecological community that is also on the Commonwealth priority list, are present along the mapped drainage lines in the Razorback area.

Restoration opportunities

The site contains significant restoration opportunities for River-Flat Eucalypt Forest (PCT 835), Cumberland Plain Woodland (PCT 850) and Shale Sandstone Transition Forest (PCT 1395).

Maintaining and improving biodiversity values of stewardship sites

The management plan for a biodiversity stewardship agreement sets out actions that should be undertaken to maintain or improve the biodiversity values of the site. These plans include 'required management actions' that must be implemented on the site to achieve the predicted management gain. Active restoration management actions are in addition to the required management actions and can be used to create additional biodiversity credits.

Landholders with agreements in place must conduct annual monitoring and reporting to demonstrate how annual payments have been used to manage the land in accordance with the management plan. The Biodiversity Conservation Trust can also provide advice to landholders to manage their land in accordance with the management plan if required. All landholders receive annual management payments which fund the cost of management work on their stewardship sites.

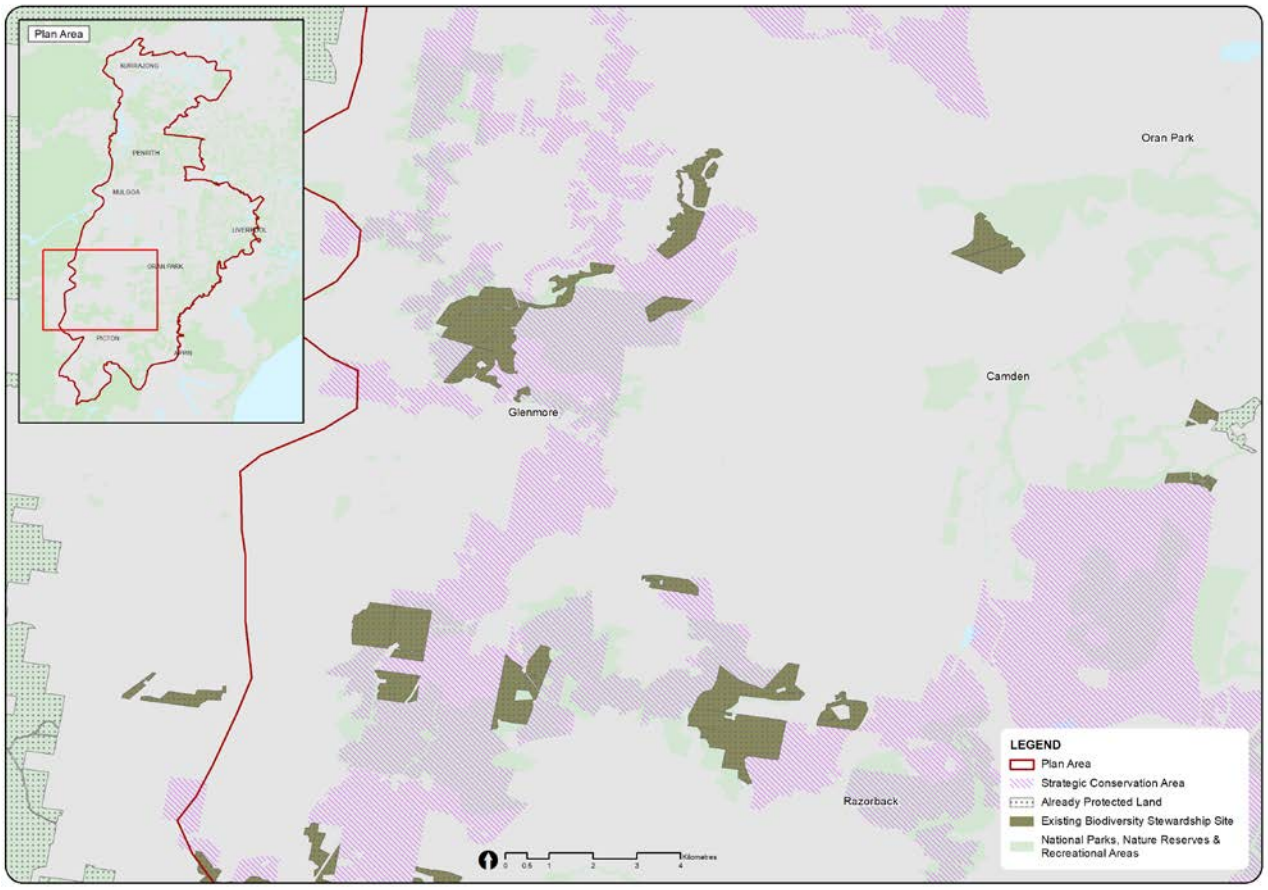


Figure 17: Opportunities for conservation through private land conservation in the Razorback area.

Ecological restoration opportunities

Historically, vegetation in the Plan Area has been cleared for agriculture and more intensive land uses. This has resulted in extensive fragmentation of the remaining native vegetation, reduced connectivity and overall loss of ecological resilience.

Approximately 13% of the pre-1750 extent of native vegetation in the Cumberland subregion remains intact and in good condition. An additional 12% has heavily degraded communities (for example, scattered trees) in disturbed areas (DECCW 2010).

Ecological restoration can play a critical role in improving connectivity between remnant habitat patches, expanding the areas of remnant habitat and replacing some areas of over-cleared vegetation communities.

The Society for Ecological Restoration defines 'ecological restoration' as 'the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed'. In practice, ecological restoration can encompass all actions to restore biodiversity structure and function, ranging from ecological maintenance to reconstruction (see Figure 18).

Significant effort has been made using restoration techniques to improve the extent and condition of native vegetation in the Cumberland subregion (DECCW 2010). Restoration efforts have focused both on individual sites (see case study 5) and across connected corridors (see case study 6).

The Plan's conservation program will build on the efforts and techniques already developed to prioritise and fund on-ground actions to actively restore the vegetation communities in the Plan Area. Activities will include restoration of threatened ecological communities for up to 25% of the Plan's target to secure 5,475 hectares of impacted native vegetation within conservation lands. Restoration to meet this target is defined as being revegetation undertaken in vegetation zones or management zones in a Biodiversity Stewardship Agreement that have a vegetation integrity (VI) score of less than 15 for, as determined in the Biodiversity Assessment Method assessment, or as simply, reconstruction.

Reconstruction efforts will focus on:

- target threatened ecological communities where there is a shortfall in established conservation lands
- expanding the habitat area for targeted threatened species
- enhancing connectivity with neighbouring reserves and neighbouring areas of high biodiversity value.

The use of VI score 15 as a cut-off is that it is inverting the offsetting process[6], which means any restoration undertaken in these areas is over and above the area that would be treated as 'native vegetation community' in a Biodiversity Assessment Method assessment.

In addition to areas where reconstruction may be required, all conservation sites established under the Plan, whether as Biodiversity Stewardship Agreements on private land or land purchased for later transition to a reserve, will comply with the required management actions for a stewardship site. Required or active management actions will be determined by the Biodiversity Conservation Trust in accordance with their Restoring Native Vegetation guidelines. Activities will include native vegetation management (restoring or rehabilitating native vegetation, retaining and managing regrowth and nutrient control), pest animal control and weed management.

[6] According to the Biodiversity Assessment Method

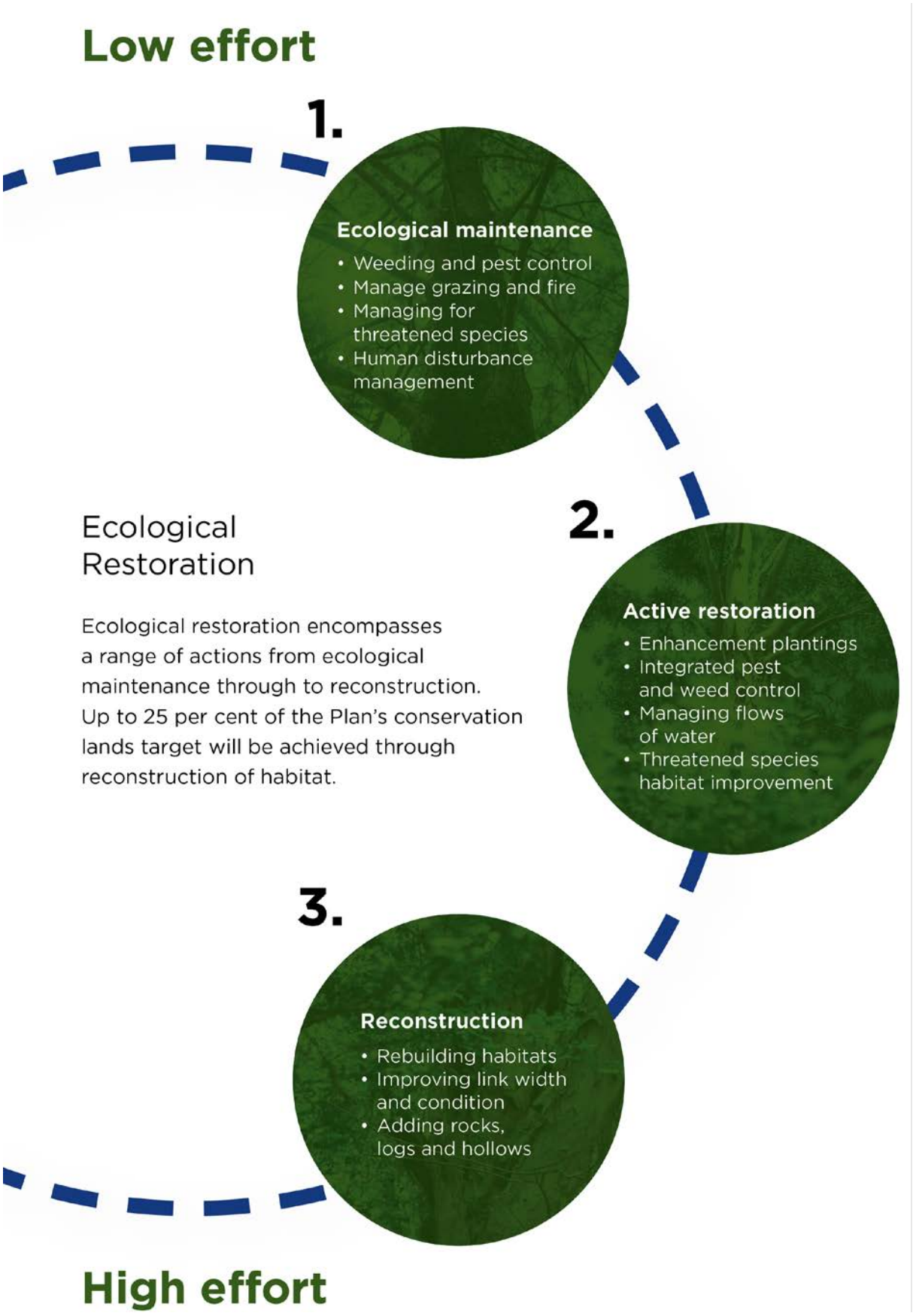


Figure 18: The range of restoration approaches and opportunities under the Plan

The department will invest in and encourage active restoration of more degraded sites, with actions ranging from assisted regeneration to reconstruction, to bring sites back to benchmark diversity, structure and function. The required management actions will depend on the condition of each site, determined at the time through a biodiversity stewardship site assessment report.

Ecological restoration implementation

The Conservation Priorities Method (Appendix D. Conservation Priorities Method) has identified potential restoration opportunities in the Plan's strategic conservation area (see Figure 18). These are areas of cleared or more degraded land that have the potential to be restored through reconstruction, to expand the extent of over-cleared vegetation communities, including threatened ecological communities s (Commitment 8, Action 4).

The department will develop a 'Restoration Implementation Strategy' in consultation with key stakeholders and delivery partners (Commitment 13, Action 1) to:

- provide a clear purpose for the undertaking of restoration
- identify restoration potential of land within priority sites
- align with and reference the NSW Biodiversity Conservation Trust Revegetation Guidelines
- identify opportunities for landholders to undertake active restoration as part of a biodiversity stewardship agreement
- identify and potentially fund active restoration on land adjacent to priority sites within new conservation lands established under the Plan
- develop a seed-procurement approach
- determine any research needs.

There is a often a significant time lag between starting a project and seeing an improvement in biodiversity outcomes. The department will invest in actions to encourage landowners to enter into biodiversity stewardship agreements that include active restoration of degraded or cleared portions of their property, if this could realise an ecological (and financial) benefit. This will be achieved through the community engagement program that will be developed for landowners in the strategic conservation area (Commitment 8, Action 10).

Where the restoration strategy identifies a priority restoration site on land that may transition to a public reserve, the department will work with the landowners on any necessary action. Any large-scale ecological restoration projects implemented through the Plan will be undertaken on public land, when there is security of tenure in perpetuity. This will include existing public land and land that is acquired under the Plan.

The reserves prioritised for establishment in the first five years of the Plan's implementation will provide opportunities for restoration. The Gulguer Reserve investigation area could provide up to 445 hectares of cleared land for ecological reconstruction, and the Confluence Reserve investigation area could provide up to 365 hectares. Key target plant community types and threatened ecological communities listed under both the BC Act and the EPBC Act occur in these areas, offering significant opportunities to achieve target offsets.

It is envisaged that a large component of the on-ground restoration work will start in the first 10 years of the Plan's implementation (depending on acquisitions or securing stewardship agreements). However, ecological restoration activities and identification of new opportunities for restoration will occur throughout the life of the Plan. The Plan will also fund research into improved techniques for restoring threatened ecological communities, to inform planning for future restoration projects.

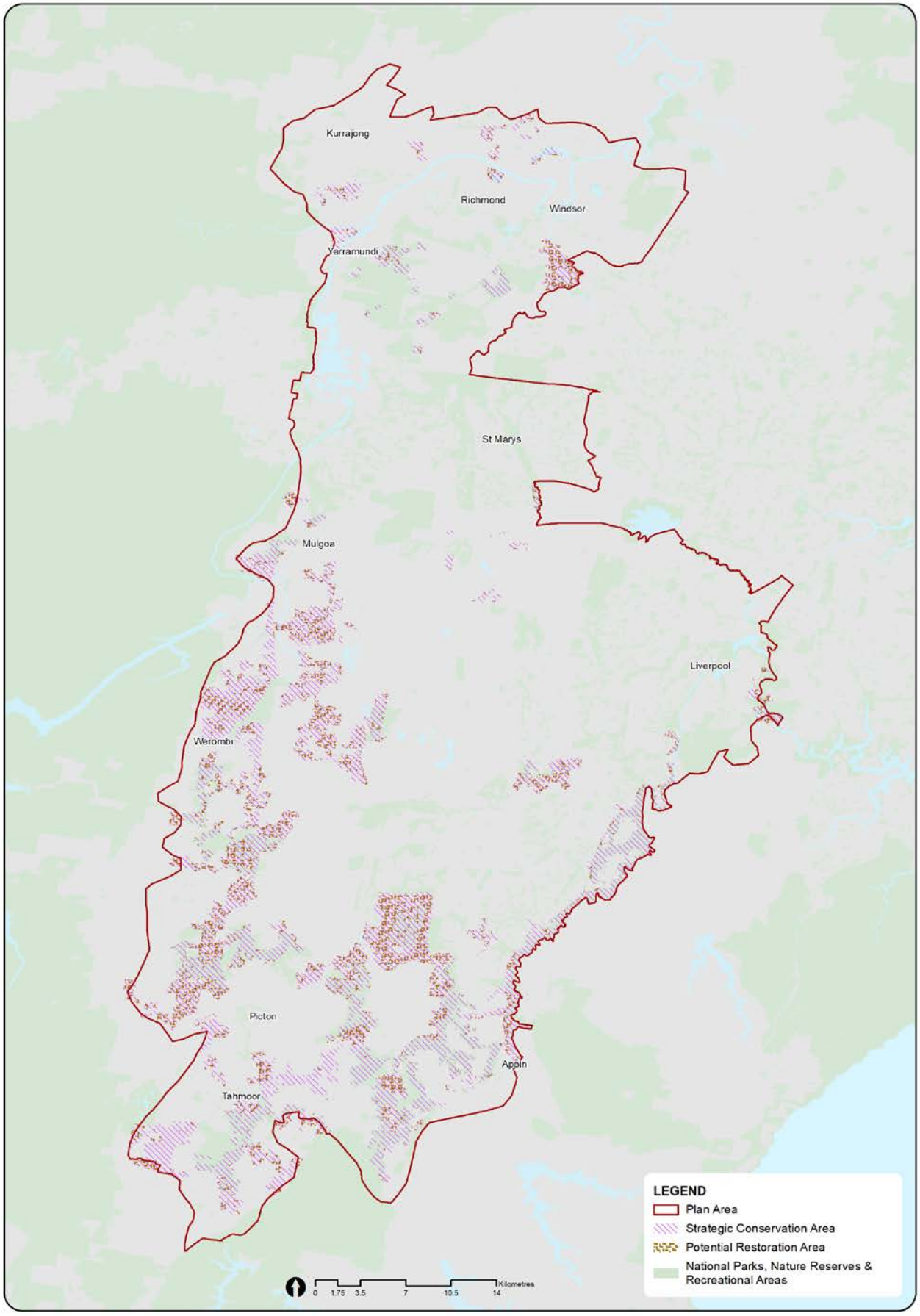


Figure 19: Potential restoration areas in the Plan Area

The Office of Strategic Lands will be a critical delivery partner where land is to be acquired for conservation and restoration. It is intended that biodiversity stewardship agreements will be established over any new parcels of land Office of Strategic Lands acquires for transition to a reserve.

Annual payments from retiring biodiversity credits will be used to undertake required management actions, and active restoration, where required.

The National Parks and Wildlife Service, local government and Western Sydney Parklands Trust are all potential long-term land managers. There is also scope to expand to other community-based conservation organisations active in the region. The appropriate long-term manager will be identified and engaged early for each reserve proposal.

Case study 5. Scheyville National Park: Groundcover restoration trial site

Scheyville National Park, located in the Hawkesbury local government area, contains areas with threatened ecological communities, species and their habitats. It also includes large areas that were previously cleared for agriculture and other uses. Scheyville National Park is currently the site of one of several restoration trials being undertaken in partnership with Greening Australia (and in this case the National Parks and Wildlife Service) to direct-seed Cumberland Plain groundcover flora to reconstruct plant communities in a highly fragmented landscape.

Soil preparation and seed sowing

Initial preparation involved herbicide treatments to remove weed biomass. At many sites, the upper layer of topsoil has elevated nutrient levels due to past agricultural uses. To allow the native seed to compete effectively with weeds, the surface layer was scraped off using earthmoving machinery to achieve a more natural nutrient balance. This also helps remove the weed seed load in the topsoil layer. Carbon can also be added to the soil to help achieve a more natural carbon–nitrogen balance.

Weed management can be a major problem in groundcover restoration, but as native species are adapted to fire, burning can be a key management tool. The Scheyville site was dominated by weeds such as African lovegrass prior to restoration.

Tree planting or natural regeneration of trees generally needs to be delayed until the native groundcover has been established so that fire can be supressed during the tree establishment phase.

Greening Australia's Richmond seed production area

This restoration trial relied on establishing the Greening Australia seed production facility at Richmond because the amount of seed (quantity and species diversity) required for the project was not available via wild collection or commercial suppliers. Seed is collected in small quantities from remnant wild populations of ground cover plants and cultivated at the facility to produce enough seed to increase groundcover in restoration projects. Seed sources from wild populations are now extremely limited and restoration of large-scale native grassland and grassy woodland requires additional seed production capacity at facilities like the one at Richmond.

Case study 6. Cumberland Stepping Stones Project (2016–17)

The Cumberland Stepping Stones project ran for 12 months in 2016–17, including the evaluation stage. The focus was to create connectivity and actively engage the community in environmental restoration. The project involved six local government areas in Western Sydney (Blue Mountains, Penrith, Blacktown, Hawkesbury, Fairfield and Liverpool) and targeted four key participant groups: schools, corporate volunteers, community Bush Care groups and private landholders. The conservation program was implemented by Greening Australia and supported by $2.9 million from the Australian Government.

Three regional corridors were targeted:

- Eastern Creek, with the aim of improving connectivity in the north–south corridor to link high-quality remnant Cumberland Plain Woodland
- Ropes Creek and Wianamatta (South Creek), providing an east–west corridor across the Cumberland Plain to link the Cumberland Plain Woodland and the Greater Blue Mountains World Heritage Area
- Scheyville to Wianamatta Corridor, supporting connectivity of the northern Cumberland Plain Woodland by enhancing connections with lowland areas.

Over a 12-month period 43 sites were planted out using around 75,000 native tube stock, and around 3,000 people were engaged in the conservation program (Dollin 2017).

Issues and outcomes

The intensive tree planting reflected the Australian Government's 20 million trees objective. This objective, in combination with the focus on community engagement, tends to promote close tree planting rather than an open woodland environment, which would be a better reflection of the Cumberland Plain environment before European settlement. The short timeframe also means that groundcover and undergrowth condition are largely overlooked.

The Cumberland Stepping Stones project had some success in terms of education and community engagement. It highlights the need to plan and implement biodiversity conservation programs over longer timeframes. The objective of creating greater connectivity in the landscape by augmenting corridors remains valid; however, more holistic targets than a tree planting count will be needed to achieve ecosystem recovery.

Protecting threatened flora and fauna

The Plan Area is home to around 100 threatened flora and fauna species. Of those, 49 species protected under either the BC Act, EPBC Act or both, may be impacted by the urban and transport development facilitated by the Plan (Open Lines 2020).

Of those 49 species, 15 species have been identified as target species under the Plan. These are species where residual adverse risks from development through the Plan were assessed as being high. A risk-based approach was undertaken due to the inherent level of uncertainty in the baseline data both for species habitat and species records.

The determination of what EPBC Act-listed species need offsets was based on the level of risk of residual adverse direct impacts undertaken for each species determined by the Assessment Report.

BC Act-listed species needing offset targets were considered to be candidate species credit species directly impacted by the development in relation to:

- Species populations, or
- Habitat for highly restricted species (endemic or largely endemic to the Cumberland Plain) that was considered likely to contain the species (records not present), based on advice of the ecological consultants, or
- Priority management sites for site-managed species under the SOS program

The 15 target species are identified in Commitment 9 (see Appendix A. Commitments and actions).

For 13 of these species, a target number of offset locations is used as the target. An ‘offset location’ is a site where one or more populations and habitat of the species has been confirmed through surveys or an expert report as being present. Offset location sites may be reserves or BSA sites.

For two species considered at-risk, the Swift Parrot and the Koala, offset targets for habitat were considered more appropriate. For the Swift Parrot, the offset target is ‘potential foraging habitat’ while for the Koala the offset target is ‘important habitat’ (defined as primary and secondary corridors).

Meeting species targets

Achieving the Plan’s species targets will be guided by the conservation lands selection steps. These steps prioritise the acquisition of species credits through the establishment of conservation lands under the Plan but also allow the direct purchase of species credits from within the Cumberland subregion or across NSW. In certain circumstances where direct acquisition of land-based offsets cannot be secured, the program would allow the implementation of a conservation action if it will directly benefit the impacted species. This is further detailed in the ‘Establishing conservation lands as offsets’ section (see page 83).

In addition to meeting the specific offset targets for the 15 threatened species, the potential habitat for all 49 of the Plan’s threatened species will be protected through securing the Plan’s threatened ecological community targets within conservation lands, as in many cases, species habitat and areas of threatened ecological communities will overlap. The Plan’s reconciliation accounting process will track the Plan’s progress in securing potential habitat for species in addition to the specific offset targets for at-risk species. This will ensure potential habitat for all impacted species are represented in the Plan’s conservation lands (see page 88).

Tracking offsets will require surveys in the strategic conservation area or other avoided lands before establishing a biodiversity stewardship site or reserve to confirm the presence of populations and amounts of likely or known habitat (in hectares).

In addition, the department will work with future land managers of conservation lands established under the Plan to identify species-specific management measures to incorporate into management plans for that land to further the protection for those species.

The Plan's evaluation program will monitor progress towards achieving targets. The evaluation program is outlined on page 97 and detailed from page 99.

Species-specific commitments for koalas

The conservation program includes specific commitments and actions to protect the Southern Sydney koala population. These are detailed in Sub-Plan B.

Implementation through planning controls

The department proposes to introduce a new State Environmental Planning Policy (SEPP) for strategic conservation planning. The purpose of the proposed SEPP is to ensure that development in the nominated areas is consistent with the BC Act, the EPBC Act and the Plan's commitments and actions.

The proposed SEPP will also minimise impacts on areas of high biodiversity value and provide the best opportunities, through the planning system, to deliver biodiversity outcomes and support the ecological function of the Cumberland subregion. The *Explanation of Intended Effect for State Environmental Planning Policy for Strategic Conservation Planning* is currently on public exhibition.

To support the protection of land with strategic biodiversity value, the Plan proposes to introduce:

- environmental conservation zoning to protect areas avoided for biodiversity purposes and riparian corridors
- a requirement that urban-capable land in precinct plans covered by the biodiversity approvals are consistent with the areas of certified land, and protect avoided land identified in the Plan
- planning controls designed to minimise impacts on land identified as having strategic biodiversity value, including:
    - areas with high biodiversity value
    - areas with important connectivity or ecological restoration potential
- planning clauses to support the identification, management and acquisition of sites that have been proposed for future public lands conservation (for example public reserves and new or additional national parks) to offset development impacts and help meet the Plan's commitments
- updates to relevant development control plans to incorporate controls to be developed according to the Koala Habitat Protection Guidelines for areas adjacent to locations where exclusion fencing is not viable due to slope, heritage or watercourses
- planning controls to support essential infrastructure development by public authorities on non-certified land in the nominated areas identified under the Plan for approval under Part 10 of the EPBC Act
- a Ministerial Direction under section 9.1 of the EP&A Act to protect areas identified as having strategic biodiversity value, as well as avoided land.

As required, planning and development controls will also be drafted or amended in the relevant precinct plans, neighbourhood plans and associated development control plans to address threats to biodiversity, reduce the indirect impacts of urban and transport development and strengthen conservation outcomes (Commitments 2, 4, 5, 6, 13,14).

Land owned or under claim by LALCs in the strategic conservation area, or the environmental conservation (E2) zone will not have planning controls applied over the land without consultation.

Minimising impacts from adjoining land uses

The department is also proposing to introduce measures that will minimise impacts from adjoining land uses on biodiversity values within lands secured for conservation. These measures could include:

- identifying where buffers are required to minimise impacts to adjacent conservation lands and define appropriate buffer areas and/or distances for each (Commitment 15, Action 1)
- introducing planning provisions to minimise the impacts of development within buffer areas on adjacent conservation lands (Commitment 15, Action 2)
- engaging with landholders in buffer areas to encourage sympathetic ongoing land management (Commitment 15, Action 3)
- working with councils and other landholders to install signs and interpretive displays at identified conservation lands to raise awareness of the biodiversity values of the site (Commitment 15, Action 4).

Integration with local strategic planning statements

To complement the above measures, the department will work with local councils to integrate strategic conservation area mapping in local and regional planning. This would be done through local strategic planning statements (LSPS), which guide the local plan-making process (Commitment 14, Action 3).

This could involve providing:

- input for LSPSs to guide land use planning for biodiversity conservation
- input for LSPSs for draft biodiversity conservation planning priorities
- input for LSPSs to guide local governments as they establish Biodiversity Stewardship Agreements
- data from the Plan to councils for adoption in biodiversity strategies, plans and planning for habitat corridors.

Managing landscape threats

Managing landscape threats highlights:

- Coordinate landscape-scale conservation programs to manage the threats of weeds, pest animals and disease.
- Manage fire in strategic locations to help maintain biodiversity.
- Use support conservation programs to help threatened ecological communities and species adapt to the impacts of climate change.

The Plan Area is a highly fragmented landscape that has been subject to a multitude of development pressures over time. It is also one of the fastest-growing regions in Australia (DECCW 2010), with four nominated areas planned to support future housing and employment needs in Western Sydney.

Increased urbanisation brings increased threats to biodiversity, such as habitat loss, weed invasion, pest animals and disease. Reducing and managing threats to the area's biodiversity in a strategic and coordinated manner will play a critical role in achieving the Plan's objective to improve ecological function and resilience over the long term. It will be particularly important to focus efforts on new conservation lands to ensure management is active, targeted and holistic.

Key threatening processes

A threatening process can be defined as a process that threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community. Threatening processes drive the extinction of native flora and fauna and their ecological communities and are therefore covered by the BC Act and EPBC Act.

A total of 43 key threatening processes are listed under NSW and Commonwealth legislation in the Plan Area. Some of these are widespread across the Plan Area and affect a broad range of protected species and ecological communities. Others tend to be site-specific or are specific to certain animal or plant species.

The Assessment Report identified the following as presenting the most significant threat to the persistence of threatened species and threatened ecological communities in the Cumberland subregion: weeds, pest animals, fire, disease and climate change.

The following sections outline the approach to implementing a threat management program for these key threatening processes and outline priority actions to be taken.

Developing an appropriate threat management program

The Plan proposes to implement key strategic priorities that will most benefit biodiversity at a landscape scale. The approach to threat management has considered the following factors.

Scope and scale of threat: Identifies the scope and scale of threats that affect species and threatened ecological communities, targeting threats that pose the greatest risk to biodiversity and where management responses may be the most effective.

Synergies and interdependencies: Identifies threats affecting multiple species that can gain synergistic benefits from targeted management responses. Understanding linkages and interdependencies between threats and the impact on biodiversity is critical to ensuring effective management responses and ameliorating unintended consequences.

Planning for long-term change: Planning should consider how increased urbanisation to the year 2056 will exacerbate existing threats and potentially bring about new threats to species and ecological communities. Anthropogenic climate change has the potential to bring about landscape-scale changes that can compound or introduce new threats to biodiversity.

Managing and controlling the extent of weeds

Native vegetation in the Plan Area is particularly vulnerable to weed invasion due to having a grassy understorey, relatively fertile soils and past agricultural uses (DECCW 2010). As a result, many weeds, such as African olive (*Olea europea* subsp. *cuspidata*), African lovegrass (*Eragrostis curvula*) and Bridal creeper (*Myrsiphyllum asparagoides*) are well established in South Western and Western Sydney. Invading weeds displace native plants, affecting the regeneration of communities (Benson, 1992), which can then cause a structural change in habitat and affect the ongoing presence of native species.

Escaped garden plants (either from cultivation or dumping) are an emerging threat associated with increased urbanisation. For these potential weeds, it is imperative to address their presence early to reduce the increased magnitude of cost once they are well established across the landscape.

Weeds not likely to affect a broad range of species, or that have such a low level of environmental harm that they can be managed through regular weeding at managed sites, will not be targeted through this program.

Implementing a coordinated weed management program

The conservation program will focus on reducing key weed species in conservation lands established under the Plan. It will target weeds that have the most impact, such as exotic vines and scramblers; African olive (see case study 7); African boxthorn; Bitou bush and boneseed; exotic perennial grasses; and other readily dispersed or persistent escaped garden plants.

The priority action to be taken during the first year of implementation is to assess the extent of existing weeds in areas identified as important for conservation and in nearby areas that may influence the important areas by continuing to allow weeds to re-enter the area covered by the Plan (Commitment 16, Action 2).

Using this assessment, a ‘Weed Control Implementation Strategy’ will be developed for a coordinated weed control program to:

- identify priority weed species and priority locations for weed control to maximise benefits to the strategic conservation area
- provide guidance on weed control methods
- identify roles, responsibilities, delivery partners and other stakeholders, including Bushcare and Landcare groups
- guide decisions on funding under the weed control program.

Priority weeds should also be targeted for treatment in lands near conservation lands to improve the landscape-level outcomes and limit the opportunity for re-infestation. Particular weed species may also be targeted outside priority areas when these species have a high capacity to spread or are likely to re-infest areas where these species are under control.

The importance of efforts to improve the extent and condition of native vegetation outside conservation lands or to establish buffers, corridors and other ecological linkages between them is also recognised. This work could make a valuable contribution to the new conservation lands and assist in conserving biodiversity more generally.

To accommodate this, the Plan will fund grants to Bushcare and Landcare groups to reduce weeds on public land adjoining or near conservation lands (Commitment 16, Action 6). It will also fund grants to Local Aboriginal Land Councils to reduce weeds on Aboriginal-owned land adjoining or near conservation lands (Commitment 16, Action 7).

The approach to weed control for biodiversity stewardship sites established under the Plan will be consistent with the weed management requirements for other biodiversity stewardship sites.

Case study 7. Managing African olive in Mount Annan

Overview

African olive is native to eastern Africa and was introduced in Australia as a hedging plant and rootstock for the common olive (*Olea europaea* subsp. *europaea***)** in early colonial times (Australian Association of Bush Regenerators (AABR) 2011). Camden was an introduction site for the future woody weed. It established in hilly areas in this vicinity, including at Razorback Range, becoming a major weed by the mid-1970s. By the 1980s, it was established in the Australian Botanic Garden Mount Annan (Department of Primary Industries (DPI) 2010). Its distribution in the gardens expanded from 20 hectares in 1985 to 80 hectares by the late 2000s. Currently, the Camden–Campbelltown area "is the most established centre of African olive occurrence in Australia" (DPI 2010, p. 3). African olive is listed as a key threatening process in the Cumberland Plain (Australian Government Threatened Species Scientific Committee, 2009).

Mount Annan site

The Mount Annan botanical garden covers 416 hectares and is located west of the Greater Macarthur Growth Area. It is home to threatened ecological communities including Cumberland Plain Woodland. The site is impacted by up to 75 hectares of African olive forest and 31 hectares of understorey invasion in woodlands. Around 37 hectares of timbered bushland on the site is considered free of African olive.

Management outcomes

Mount Annan has successfully reduced some of the extent and impact of African olive, working on several mitigation and abatement strategies with partners such as Greening Australia (AABR 2011). Targeted actions include site-specific herbicide spraying and plant removal. It has also controlled its spread using selective herbicide on 10 hectares and follow-up spraying on 2.3 hectares of previously cleared sites.

Geographical information system and global positioning system information on native trees emerging from the African olive canopy in densely forested areas was mapped for the site. These areas were then treated within a 10-metre radius to facilitate natural seedling regeneration for at least 28 trees over 1 hectare. Weed control activities also extended beyond the site to maximise the synergies of conservation efforts with surrounding areas.

Overall, several abatement actions have succeeded on the site, increasing the quality of habitat and corridors for species at a regional scale.

Managing emergent pest animal species

Pest animals have numerous adverse effects on native flora and fauna in the Plan Area, including predation, overgrazing and competition. Control of pest animals is generally undertaken in accordance with a Regional Strategic Pest Animal Plan prepared by Local Land Services. In the Greater Sydney Local Land Services, which covers the entire area of the Plan, nine priority species are identified: wild dogs, feral pigs, red foxes, wild rabbits, wild deer, cats, feral goats, Indian mynas and common carp (LLS 2018).

All landholders have a duty under the *Biosecurity Act 2015* (Cth) to 'prevent, eradicate, contain and/or manage pest animals'. Control of pest animals can be undertaken in several ways. In larger landholdings, typical methods include poisons (including targeted baiting), shooting and trapping. However, in peri-urban and urban areas, control measures related to pet safety are restricted.

The Menangle Fox Control Group (see case study 8) is an interesting example of a successful capacity-building program for fox management. It is coordinated across agencies and its learnings can be implemented under the Plan.

Implementing a coordinated pest management program

Coordinated control activities will be implemented within the conservation lands and throughout the Plan Area to work towards eradicating pest animals in the Cumberland subregion.

Similar to addressing the threat of weeds, one of the Plan's priority actions is assessing the extent and threat existing pest species pose to the strategic conservation area (Commitment 17, Action 2). Based on this assessment, a 'Pest Animal Control Implementation Strategy' will be developed to:

- identify pest control priorities, including priority pest species and locations, to maximise benefits to the strategic conservation area
- guide pest control methods
- identify roles, responsibilities, delivery partners and other stakeholders
- guide funding allocations under the pest control program.

The likely delivery partners for pest animal management are Local Land Services, local government, Office of Strategic Lands and Biodiversity Conservation Trust. For managed conservation lands adjacent to urban areas, the control measures identified in the Pest Animal Control Implementation Strategy would be built into a management plan for the site. This would be prepared in consultation with local government, Local Land Services and the landholder. The public would be notified about any planned pest control actions.

The approach to pest animal control for biodiversity stewardship sites established under the Plan will be consistent with the pest animal control requirements for other biodiversity stewardship sites. In these cases, the Biodiversity Conservation Trust will be responsible for ensuring that landholders comply with pest control measures on stewardship sites. Stewardship sites not in peri-urban or urban areas could be subject to a wider array of control measures, which will be identified in the management plan for the site.

Reserves managed by National Parks and Wildlife Services, or Office of Strategic Lands in the interim, will also comply with pest control measures specified in the management plan. The department will enter into written agreements with delivery partners to ensure the pest animal control program is implemented as agreed (Commitment 17, Action 3).

Coordination of pest control actions outside the conservation lands will occur through existing processes including through Local Land Services and local government.

Case study 8. Capacity-building program for fox management

Overview

The fox (*Vulpes vulpes*) is a feral animal species with significant impacts on biodiversity in Western Sydney and other regions throughout Australia. Predation by foxes is a key threatening process under the BC Act and the EPBC Act. The species was introduced into Australia in the 1800s and established in the wild by the 1870s (Department of the Environment, Water, Heritage and the Arts 2008). Foxes are a threat to small- to medium-sized mammals (for example, the Spotted-tailed Quoll) and ground nesting birds (for example, Bush Stone-curlew). Not only do foxes have a direct impact on native fauna through predation, they can also carry disease (Greater Sydney LLS n.d.).

Menangle Fox Control Group

The GSLLS launched the Menangle Fox Control Group in 2016 in partnership with Barragal Landcare Group, NSW DPI, Campbelltown City Council, Camden Council and Wollondilly Council (Campbelltown City Council n.d.). The group is funded under the National Landcare Program and operates between Gilead and Camden. It includes training and educational activities to help managers and landowners implement fox-control and risk-reduction measures on their land.

Program implementation

Participants in the Menangle Fox Control Group can use FeralScan or FoxScan websites or applications to record fox occurrences and impacts, and to implement control activities (GSLLS n.d.). Accredited landholders can be trained to lay bait on their land at little or no cost. MFCG shares cameras to capture images of foxes and cages for trapping and assists with trap training and licensing.

Learnings

The Menangle Fox Control Group framework can be adopted or extrapolated into threat management actions for the Plan. The Plan could also use the existing FeralScan application to integrate information with landholders outside the Plan Area.

Managing bushfire risk

Fire is a natural element of the ecology of most vegetation communities in the Cumberland subregion. Prior to European settlement, Aboriginal communities used fire to shape the landscape and create areas of open woodland that enhanced hunting opportunities or promoted the growth of seeding plants that were a food source (Benson 1990).

The fire regime changed significantly after European settlement, including extensive clearing in the Plan area. Managing risks to life and property became the central objective. This remains a key objective, but fire management planning also needs to consider ecosystem processes and biodiversity outcomes.

Fire frequency, the temperature, the season, prior and subsequent weather conditions, and proximity to unburnt refuge areas can all influence an ecosystem's response to fire. Many species regenerate quickly from rootstock or trunks, while fire kills other plant species. Local eucalypt species are particularly adapted to fire. Shorter-lived species that are killed by fire need a minimum fire-free period between burns to build up their seed reserves. Having shorter periods between fires eliminates these species from the plant community.

The absence of fire eliminates fire-dependent species, while frequent burning largely eliminates species that regenerate by reseeding. Both management regimes have the effect of reducing the biodiversity of the plant community, with the flow-on effect of a reduced range of food sources and habitat for fauna.

NSW bushfires in 2019-20

In 2019–20, bushfires in NSW were unprecedented in their extent and intensity. As at 28 January 2020, the fires had burnt 5.3 million hectares (6.7% per cent of NSW), including 2.7 million hectares in national parks (37% of the national park estate) and more than 80% of the Greater Blue Mountains World Heritage Area (Department of Planning, Industry and Environment, 2020).

The fires destroyed large areas of habitat and populations of some species potentially impacted by development under the Plan. Because of the unprecedented extent and intensity of the fires, their effect on some species is uncertain, including whether they will recover.

An initial assessment, based on available information, has been made of the implications of the fires for the Plan. It aimed to:

- identify any species significantly impacted by the fires that could also be affected by the Plan
- determine whether the fires increase the significance of the Plan's impacts on species.

The assessment found special attention will need to be paid to eight species to ensure adequate consideration of the Plan's impacts and subsequent offsets. These include potentially prioritising these species for protection in new conservation lands. The species are:

- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Grevillea parviflora* subsp. *parviflora* (Small-flower Grevillea)
- *Pomaderris brunnea* (Brown Pomaderris)
- *Persoonia bargoensis* (Bargo Geebung)
- *Acacia bynoeana* (Bynoe's Wattle)
- *Eucalyptus benthamii* (Camden White Gum)
- *Commersonia prostrata* (Dwarf Kerrawang)
- *Myotis macropus* (Southern Myotis).

The assessment will be reviewed as further information on the impacts of the fires becomes available.

This recent experience and climate modelling of future trends indicate that the bushfire season has extended, generally starting earlier and finishing later than in the past. This will have an impact on opportunities to undertake controlled burns to protect life and property, and to manage the ecosystem.

Implementing a bushfire management program

The Plan commits to managing fire in strategic locations in the Cumberland subregion to support the maintenance of biodiversity values on conservation lands within the Plan Area (Commitment 18).

To do this, key agency and delivery partners, such as the Rural Fire Service, National Parks and Wildlife Service and the Environment, Energy and Science Group of this department, will be consulted to identify fire management priorities, including fire-sensitive species and ecological communities (Commitment 18, Action 1).

The approach to fire management and ecological burning on biodiversity stewardship sites established under the Plan will be consistent with the requirements for other biodiversity stewardship sites.

Aboriginal traditional owners will be consulted so that their fire management techniques can be applied to conservation lands (Commitment 18, Action 2).

A 'Fire Management Strategy' for the strategic conservation area will be developed to:

- identify priority locations for fire management to maximise benefits to the strategic conservation area
- identify priority fire-sensitive species and ecological communities
- provide guidance on fire management to maintain and promote biodiversity values, particularly for fire-sensitive species and ecological communities
- identify roles and responsibilities and coordinate delivery partners
- identify criteria to guide decisions on funding fire management under the Plan.

Managing bushfire threats to life and property will remain the responsibility of NSW Fire and Rescue and the Rural Fire Service.

Managing key diseases

Diseases such as exotic fungal infections, viruses and other pathogens can weaken and kill native species. Diseases that are listed as key threatening processes in the Plan Area include:

- *Phytophthora cinnamomi* root fungus
- amphibian chytrid fungus (chytridiomycosis)
- psittacine circoviral beak and feather disease.

Increasing urbanisation of the area could exacerbate the occurrence of these diseases. There are uncertainties about the plant species and communities that are likely to be more heavily impacted by *Phytophthora* infection. But it is understood that increased human recreational use of forested and riparian areas increases the spread of the disease.

The potential for dispersing chytridiomycosis in wild frog populations increases with urbanisation of the landscape matrix around streams. This comes from growing potential for human interaction, more water flow (urban run-off) and reduced optimal habitat.

Psittacine circoviral (beak and feather) disease affects threatened species and populations in the parrot and cockatoo families, and pet birds are more likely to transfer it to wild bird populations. As urbanisation increases, the chances of disease transmission to wild birds increases.

While not strictly a disease, psyllid and Bell Miner–associated dieback in eucalypts is a widespread threat in much of the shale soil area in the Plan Area. It is also more likely to occur in areas with streams. Bell Miners are establishing colonies at sites with thickening vegetation, particularly where African olives are producing a mesic or closed-forest form of woody community.

Implementing a disease management program

Two key actions in the Plan will seek to address and manage the spread of disease and its impact on biodiversity in the Cumberland subregion.

The department will consult with researchers, government agencies and other delivery partners to identify relevant programs that contribute to managing disease and dieback in the Cumberland subregion. Key threats that will be targeted include:

- *Phytophthora cinnamomi* root fungus
- amphibian chytrid fungus
- psittacine circoviral beak and feather disease

- psyllid and Bell Miner–associated dieback in Eucalypts.

The department will enter into written agreements with delivery partners to implement priority disease control programs.

Providing support for climate change adaptation

Climate change is emerging as a serious threat to native species and ecosystems and is expected to be an ongoing challenge to their effective conservation in Western Sydney. Currently, Western Sydney experiences an average of 10 to 20 hot days a year (where the maximum temperature is above 35° C). By 2039, Western Sydney is projected to experience an additional 5–10 hot days a year. By 2070, this is expected to rise to an additional 10–20 hot days (OEH 2018). These hotter temperatures, combined with changes to bushfire and rainfall patterns, are likely to place additional pressure on Western Sydney's biodiversity.

The main changes that are expected include increased daytime maximum, mean and overnight minimum temperatures; reduced rainfall frequency; and decreased rainfall totals. Other changes include a likely increase in the frequency and intensity of fires and a reduced capacity to undertake fire management through hazard reduction as suitable conditions become less extensive or frequent.

Individual species' responses to changing conditions, including their breeding response, recruitment of breeding adults and use of migration paths, will become increasingly important for their persistence.

Establishing conservation lands to maximise connectivity and manage key threats will provide the best opportunity for threatened ecological communities, species and their habitats to withstand future variability associated with anthropogenic climate change. As long-term climatic changes become more prevalent, conserving the connectivity of structural and high-altitude habitats will become more important to allow the movement and migration of species.

Implementing climate change adaptation measures

The Plan will support existing or new programs to help threatened ecological communities, species and their habitats adapt to the impacts of climate change in the Cumberland subregion (Commitment 20). To do this, the conservation program will take a multi-pronged approach that will include:

- Filling knowledge gaps on climate change adaptation measures for biodiversity by:
  - funding research to identify the most at-risk species and ecological communities in the Cumberland subregion
  - identifying priority locations, such as climate refugia, in the subregion to support persistence and adaptation of species and ecological communities that are at risk from climate impacts
- Nominating priority locations in the strategic conservation area to support adaptation of biodiversity to climate impacts and incorporating these into the 'Conservation Lands Implementation Strategy'
- Providing advice and support to councils to allow them to integrate the results of research, including identification of any important climate refugia in their reserve management programs.

Building knowledge and capacity

Highlights:

- Partner with local government to support biodiversity education in Western Sydney.
- Partner with Western Sydney's Aboriginal community and Aboriginal Land Councils to participate in biodiversity conservation and implementation of the Plan.
- Invest in threatened species research over the life of the Plan.
- Develop a compliance program to support biodiversity outcomes over the life of the Plan.

The Plan is underpinned by a range of supporting actions to enhance conservation outcomes by increasing the capacity of the community to participate in biodiversity conservation.

Activities such as education, training and extension services will increase awareness of biodiversity and encourage participation in conservation activities across the Plan Area. Research will enhance our knowledge of threatened species and how we can better manage and understand biodiversity values. Together, these will help to inform the adaptive management that will be needed to achieve the Plan's conservation vision for Western Sydney.

Community education and engagement

The Plan will provide opportunities for the residents of Western Sydney to learn more about biodiversity and engage in conservation programs and activities (Commitment 21, actions 1–7). This will include:

- appointing three full-time biodiversity education officers in priority local government areas to provide ongoing biodiversity education and engagement activities to communities (Commitment 21, Action 3)
- appointing two part-time Aboriginal education officers to provide ongoing biodiversity, cultural awareness and engagement activities at schools and in the community (Commitment 21, Action 4).
- raise awareness of the Southern Sydney koala population and encourage community participation in koala conservation in Western Sydney, consistent with the Plan's education and engagement program (Commitment 21, Action 7).

An effective education and engagement program will contribute to the overall success of the Plan by increasing residents' understanding of their surrounding environment and its importance to native flora and fauna, as well as local Aboriginal culture. The department will partner with environment groups, education facilities and local government to provide these education and engagement programs.

Long term benefits that may flow from residents increasing their understanding of the environment and its biodiversity include greater involvement in ecological restoration activities; more awareness of the value of native species in gardens; more interest and involvement in citizen science programs; and reduced rubbish dumping and damage from inappropriate recreational activities.

Proposed activities to engage residents with biodiversity will include:

- engaging with local schools to provide biodiversity education
- hosting community activities such as tree planting and nature walks
- developing a mobile education trailer as a shared resource for councils in the Plan Area
- promoting citizen science programs to encourage participation in nature-related science (see case study 9)
- raising awareness of the cultural significance of biodiversity to Aboriginal people.

The department will prepare an 'Education and Engagement Implementation Strategy' to guide the implementation of the education and engagement program (Commitment 21, Action 2).

Case study 9. Citizen science programs in Western Sydney

Citizen science programs can be valuable sources of information about biodiversity that sit outside formal research programs. Through its biodiversity education officers, the Plan will promote established citizen science monitoring programs such as those run by the Australian Museum and Birdlife Australia. These programs are building valuable databases of information about biodiversity in Sydney and beyond, while encouraging participants to connect with their local environment.

Australian Museum

The Australian Museum currently manages some of Australia's most well-known citizen science projects. Established projects relevant to Western Sydney include:

- FrogID, a national project aiming to learn more about Australian frogs
- WingTags, which is helping to understand the movement and habits of Sydney's white cockatoo and ibis populations
- Streamwatch, which enables community groups to monitor their local waterways
- Hollows as Homes, which is building a database of hollows available for wildlife in Sydney.

Birdlife Australia

Birds in Backyards is a long-running research, education and conservation program provided by Birdlife Australia. It encourages citizen scientists to collect bird data through various programs including:

- quarterly bird surveys that collect information on the distribution and abundance of birds living where people live
- the annual Aussie Backyard Bird Count, which takes place in October, providing data on trends in common bird communities from year to year.

Engaging and partnering with Aboriginal communities

The development of the Plan acknowledges more than 60,000 years of continuous Aboriginal connection to the land that makes up NSW. Aboriginal people hold profound knowledge, understanding, obligation and custodianship of the landscape, often referred to as 'connection to Country'.

Through connection to Country, Aboriginal people have developed systems of knowledge and understanding of ecology and biodiversity that represent a living symbiotic relationship with the land and waters of their traditional homelands. These systems include biodiversity, climate, land, culture and people.

Aboriginal understanding and respect for the land aligns with the Plan's objectives of ensuring planning and land use improve ecological resilience, and meet social, economic and liveability needs.

Local Aboriginal Land Councils (LALCs) constituted under the *Aboriginal Land Rights Act 1983* are major landowners in the local government areas in the Plan Area. They include the Tharawal, Deerubbin and Gandangara LALCs. They are responsible for achieving the social, cultural and economic aspirations of Aboriginal people through those holdings.

The Plan commits to ongoing engagement with Aboriginal communities in Western Sydney to provide economic opportunities arising from the Plan (Commitment 22). The department will partner with Western Sydney's Aboriginal community and LALCs to support the implementation of the Plan by developing a 10-year Aboriginal Engagement and Implementation Strategy (Commitment 22, Action 1 and 2). This strategy will ensure Aboriginal people are at the forefront of implementing the Plan and can benefit from the economic opportunities arising from the Plan.

Some of actions that could be included in the 10-year Aboriginal Engagement and Implementation Strategy are (Commitment 22, Action 1):

- establishing a partnership with NSW Aboriginal Land Council, and Western Sydney's Aboriginal community and Local Aboriginal Land Councils to support delivery of the Plan
- funding the upfront costs of biodiversity assessment to encourage and support the establishment of stewardship sites on Aboriginal-owned land
- ensuring that at least 5% of expenditure for services needed for implementation of the Plan are awarded to Aboriginal-owned businesses
- building capacity in Aboriginal businesses and organisations by providing training and start-up funding for businesses that contribute to the conservation outcomes of the Plan
- working with the Department of Crown Lands to support the speedy resolution of Aboriginal land claims under the *Aboriginal Land Rights Act 1983* for areas within potential conservation lands
- working with the National Parks and Wildlife Service (NPWS) and Local Aboriginal Land Councils to investigate opportunities for joint management of new conservation reserves by the Aboriginal community within the Plan Area
- supporting cultural activities on conservation lands such as a scheme to acknowledge and celebrate cultural values on conservation lands.

Extension services to property owners and land managers

Extension is the practice of transferring information, knowledge or skills that can assist individuals, families, communities, organisations or businesses to improve their economic, social and environmental outcomes, and create positive change.

The Plan will provide for extension services to community groups, councils, Local Aboriginal Land Councils and landholders to support biodiversity conservation on public and private land. Intended biodiversity outcomes that can be achieved with an effective extension program are listed in Box 3.

Box 3. How extension services will help improve biodiversity outcomes

Extension services can:

- encourage Local Aboriginal Land Councils and private landholders to enter into conservation agreements, therefore increasing the area of land under private biodiversity stewardship
- improve quality of biodiversity habitats by better managing threats on public and private land
- increase restoration efforts by coordinating the approach across the landscape
- improve the skills and knowledge of restoration volunteers to achieve better biodiversity outcomes.

Extension services or programs to be implemented under the Plan include:

- tailored information packages to promote stewardship options and biodiversity management on private land within the strategic conservation area (in partnership with the Biodiversity Conservation Trust)
- community workshops on managing weeds, feral animals and other threatening processes, in partnership with Local Land Services, councils, Local Aboriginal Land Councils
- training in best-practice bush regeneration and ecological restoration techniques to community groups in the Cumberland subregion, consistent with the Restoration Implementation Strategy (in partnership with restoration providers).

Research to support threatened species

Although substantial research has been conducted to try to understand the ecology of the Cumberland subregion, many research gaps need to be filled to ensure the Plan meets its intended biodiversity objectives. An ongoing research program will underpin the adaptive management needed to improve biodiversity outcomes over the life of the Plan.

The program will include:

- a five-year study of threatened species in the Cumberland subregion, conducted under the Saving our Species program
- research on the adaptive potential of threatened species and ecological communities to climate change
- research that helps improve techniques for restoring threatened ecological communities
- research and monitoring of the Southern Sydney koala population to be conducted under the *NSW Koala Strategy* (OEH, 2018)
- research into the connections between biodiversity and Aboriginal culture and practices in Western Sydney.

Knowledge and data gathered through these research programs will directly support the implementation of each of the Plan's key conservation commitments. It will also help to improve ecological knowledge about the area's threatened species and ecosystems, and our ability to monitor plant, animal and community responses to our efforts.

Research priorities

Threatened species ecology and distribution

The Plan will include a five-year research program that targets threatened species in the Cumberland subregion. This program will likely be implemented through Saving our Species. The species selected for research will include those that the Plan's impact assessment process have judged as likely to be affected by future urban development in the nominated areas.

The program will look to improve understanding of habitat requirements, the geographic distribution of species and particular responses to changing land use and climate.

Research to support restoration success

Research is needed to support large-scale restoration projects so that on-ground techniques for establishing new habitat, including maintenance and monitoring of these areas, are successful.

Greening Australia is leading the way in developing successful restoration techniques for native grassland and woodland. The techniques it has developed over recent years could transform ecological restoration on a national scale. It has established a diverse seed bank on the grounds of Western Sydney University that is overcoming some of the supply and diversity difficulties experienced when undertaking restoration. The Plan will provide funding for continued research into effective techniques, as well as resources for restoring native forest and woodland ecosystems in the Cumberland subregion.

Response to climate change

Research is required to improve the understanding of adaptation and survival of biodiversity under future climate change scenarios in the Cumberland subregion. Climate change may also negatively interact with land management and restoration activities to improve biodiversity.

Research agencies are already carrying out many relevant research programs (see case study 10). The Plan is not seeking to replicate these programs but will adopt findings that are relevant to the threatened ecological communities of the Cumberland subregion.

Koala health and welfare

The Plan will fund training and technical resources needed by wildlife carers and veterinarians through the NSW Koala Strategy. Funding will improve access to resources, veterinary services, transport and facilities. Further details of these projects can be found in Sub-Plan B.

Case study 10. Snapshot of one current climate change research project

Western Sydney University's Hawkesbury campus at Richmond supports one of the largest stands of critically endangered Cumberland Plain Woodland in Western Sydney. The university has several world-class experimental facilities in this woodland that are part of the Terrestrial Ecosystem Research Network. This network links research facilities across Australia that seek to understand how key ecosystems will respond to future environmental change.

In 2012, the Environmental Trust Research Program awarded the CSIRO Climate Adaptation Flagship program a grant to look at the role of green infrastructure in climate adaptation in Western Sydney. As Western Sydney grows, there is a risk that more people will be exposed to extreme heat and will be heavily reliant on the quality of urban development. This project quantified the role of green infrastructure in climate adaptation for extreme heat, identifying the function of urban form, and testing scenarios for future urban planning and design.

Implementation and Assurance

Corporate tree planting day in Western Sydney Parklands

Implementation and assurance

This section outlines key components of the Plan's implementation and assurance framework, including:

- governance arrangements
- the approach to securing offsets over the life of the Plan, including the assurance mechanisms
- proposed funding agreements
- the roles and responsibilities of key delivery partners.

Implementation and Assurance Framework

The Plan's Implementation and Assurance Framework (see Figure 20) has been designed to ensure success of the conservation program, reassuring the many stakeholders in the Cumberland subregion that commitments will be met.

The framework provides the foundation for the Plan's vision, objectives, intended outcomes and commitments, and for coordinated implementation.

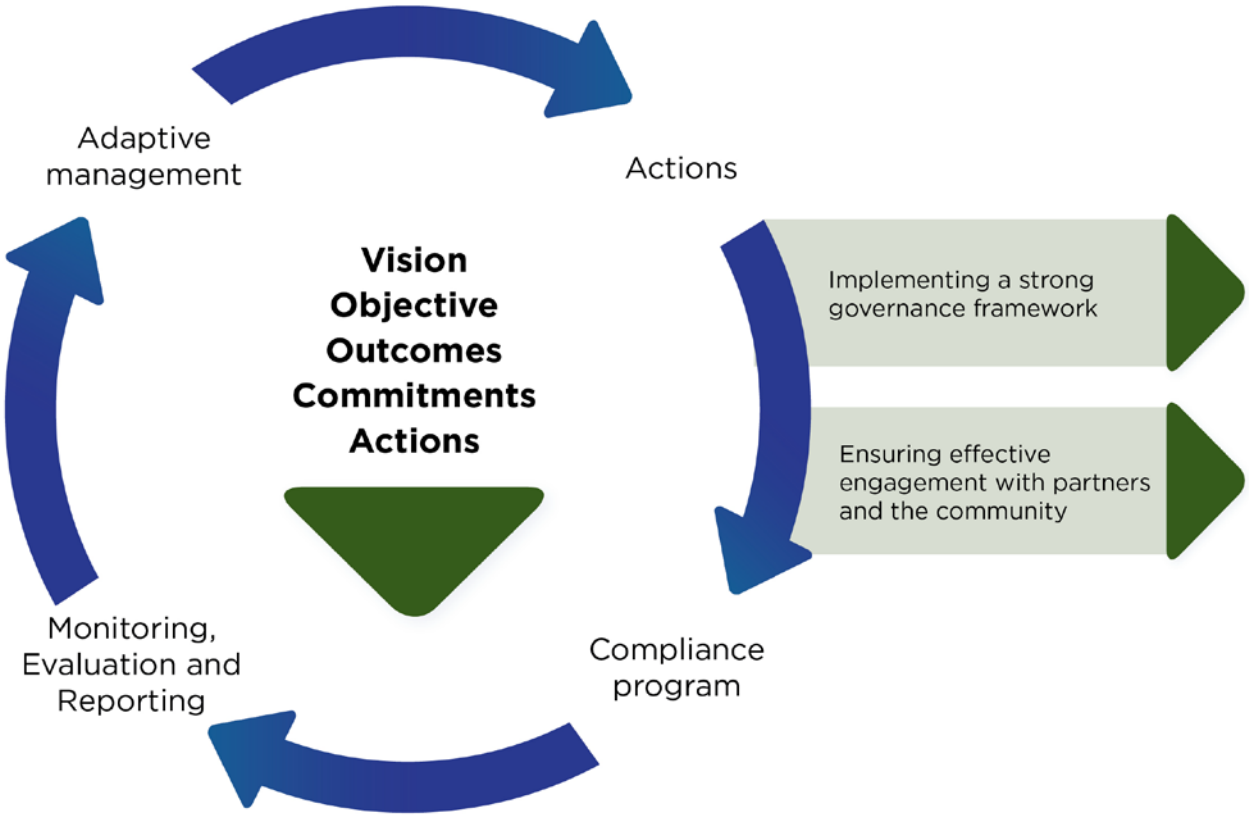


Figure 20: Implementation and Assurance Framework for the Plan

Governance

The Plan's governance structure identifies accountable parties and sets a framework for each party's role, responsibilities and reporting requirements. The overarching governance structure for the Plan is shown in Figure 21.

The department and the NSW Minister for Planning and Public Spaces will play a multifaceted role in implementing the Plan and coordinating delivery partners, who will be responsible for the day-to-day running of their associated projects and programs.

The planning for urban development is administered by the department. The infrastructure corridors program is administered by Transport for NSW, who are a major project partner of strategic conservation planning. An executive implementation committee with executive-level representatives from key government agencies will be established to oversee implementation of the Plan.

Governance of the Plan will be supported by regulation and defined roles and responsibilities. Regulatory measures include relevant provisions in the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and any conditions of consent under strategic biodiversity certification (BC Act) or class of action approval (EPBC Act).

The following sections provide further detail on the Plan's governance and implementation arrangements including:

- roles and responsibilities
- funding
- delivering conservation lands as offsets
- delivery partners
- compliance.

Roles and responsibilities

Many stakeholders have an interest in the Cumberland subregion. The Western Sydney community and Australian, NSW and local governments all have expectations that the Plan will be delivered effectively and efficiently.

Community groups and the education sector could also be engaged to undertake monitoring or provide on-ground ecological assessments. Delivery and community partners will be finalised as the needs of the conservation program emerge, and as agreements are made during the implementation of the Plan.

Department of Planning, Industry and Environment

The department is responsible for implementing the Plan and meeting regulatory requirements, as the party to the strategic biodiversity certification (under section 8.9 of the BC Act) and as the approval holder (under section 146B of the EPBC Act).

Once approved, the department will have a multifaceted role in implementing the Plan. Responsibilities will include:

- centrally coordinating the Plan, including through the executive implementation committee and any associated sub-groups and committees
- coordinating delivery partners, including setting implementation and reporting requirements

- ensuring reports from contractors and other agencies feed into the Plan's reporting framework
- managing contracts and grants
- meeting statutory requirements (as approval holder)
- reporting to the relevant Commonwealth and NSW Ministers for the Environment and for Planning
- preparing regular Plan progress reports for publication
- identifying potential or actual compliance breaches and notifying the appropriate regulatory authority.

The department will work with multiple government and non-government stakeholders to ensure efficient and effective coordination of the Plan. Service level agreements or memorandums of understanding (MoUs) are being established with key agency and delivery partners to achieve the Plan's commitments. The department will also be responsible for reporting to approval bodies, the relevant NSW and Commonwealth ministers, and the public on the progress of the Plan.

Agency partners

Planning, implementing and managing major transport infrastructure is a significant component of development facilitated through the Plan. The department will continue to work closely with Transport for NSW to ensure the infrastructure needs of local communities are adequately considered and that biodiversity values in the Plan Area are not compromised.

Executive implementation committee

An executive implementation committee will be established as the central governance committee to monitor and measure the Plan's commitments and outcomes. It will be the key point of oversight to determine the appropriate course of action on matters raised, or whether issues need to be escalated for ministerial attention. The executive implementation committee will comprise executive-level representatives from agencies with statutory responsibility for the Plan, including the Australian Government Department of Agriculture, Water and the Environment, the department and Transport for NSW.

In addition, working groups will be formed where appropriate. These groups will focus on specific implementation areas such as koalas, pest animal control, weed control and compliance and will report to the Plan's executive implementation committee.

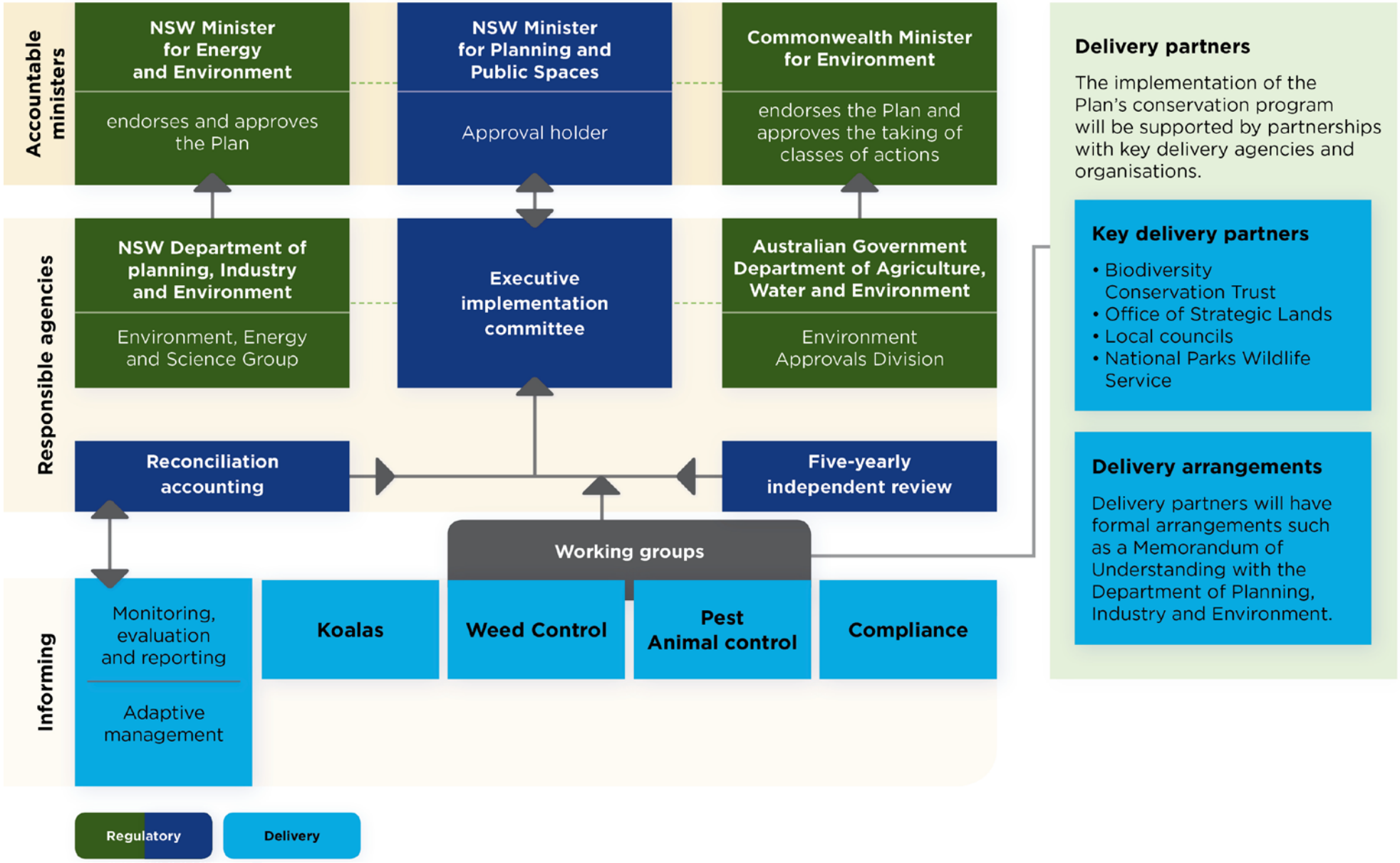


Figure 21: Detailed governance arrangements

Funding

Funding is required to implement the conservation program over the life of the Plan. The NSW Government has already committed $84 million in the first five years to implement the Plan's commitments and actions.

The Plan proposes to fund the conservation program through developer contributions. The funding model proposes to recover costs from industry through a biodiversity component of a Special Infrastructure Contribution on development in the four Western Sydney nominated areas.

A Special Infrastructure Contribution for biodiversity of $4,500 per dwelling was proposed in the Wilton and Greater Macarthur Growth Areas draft Land Use and Infrastructure Implementation Plans. The NSW Minister for Planning will consider a range of developer contribution levels, including full cost recovery, prior to making a final determination on the biodiversity component of the Special Infrastructure Contribution before the Plan is approved.

The department will regularly review the Plan's resourcing requirements to ensure it can adapt to changing circumstances and enable the long-term implementation of the conservation program.

Establishing conservation lands as offsets

The department recognises the inherent uncertainty in delivering a conservation program of this scale over a relatively long timeframe. To address risk and uncertainty, the department has developed several methods to oversee, track and establish conservation lands as biodiversity offsets over the life of the Plan. They are:

- a series of steps and principles to guide the selection of conservation lands, while providing some flexibility in delivery
- a reconciliation accounting process to reconcile offsets acquired through the Plan with development impacts throughout the life of the Plan to 2056
- adaptive management steps to align the securing of biodiversity offsets with development.

Implementing these methods will ensure the Plan's conservation targets for threatened ecological communities, and threatened flora and fauna are met over the large temporal and spatial scale of the conservation program. These methods will be subject to the independent five yearly review to ensure that they continue to be effective in delivering the Plan's commitments and outcomes.

In addition, the department is developing a 'Conservation Lands Implementation Strategy' to guide the process for investigating, acquiring and establishing land identified through the Plan's strategic conservation planning (Commitment 8, Action 1). The Implementation Strategy will include:

- priorities for establishing conservation lands to:
    - meet targets for protecting threatened ecological communities and threatened species
    - meet connectivity and restoration priorities
    - maximise long-term viability of biodiversity values
- targets and proposed timeframes for acquiring and/or protecting land through a Biodiversity Stewardship Agreement
- proposed mechanisms for securing each area of priority conservation land
- suitable land managers for each area of priority conservation land.

The department has prepared a series of principles and selection steps that guide the establishment of conservation lands and provide flexibility and assurance for a strategic

conservation outcome in the Cumberland subregion. These principles and selection steps are outlined in the following sections.

Principles for establishing conservation lands

These are the overarching principles to guide implementation decisions for acquiring conservation lands through the Plan's reserve program or establishing biodiversity stewardship sites through the Biodiversity Stewardship Agreement program. This includes decisions by the Plan's executive implementation committee, the department and the Plan's conservation lands delivery partners.

Regular reviews of program implementation will consider how offset sites delivered through the respective Biodiversity Stewardship Agreements and reserve programs are meeting these principles.

1. Conservation lands protect the best remaining, large patches of vegetation.
2. Conservation lands work efficiently together at site, local and regional scales to enhance ecological connectivity and landscape function in the long term and in a changing climate.
3. Conservation lands include active ecological restoration of degraded areas of the landscape to provide a biodiversity gain (particularly for impacted threatened ecological communities where there is a shortfall based on reconciliation accounting). Effort should focus on protecting and restoring corridors, enhancing ecological connectivity and providing vegetative buffers to core patches of intact vegetation.
4. Conservation lands offset impacted threatened species habitats and threatened ecological communities, in accordance with commitments and actions (direct offsets).
5. The selection of new reserves is informed by species adaptation needs in a changing climate – including consideration of changing distribution patterns and habitat requirements.
6. Biodiversity outcomes are improved through early delivery of conservation lands, including prioritising the acquisition of available reserve sites or through securing Biodiversity Stewardship Agreements with willing landowners.
7. Data underpinning the Plan's strategic conservation area is reviewed every five years to ensure that decision-making is supported by up-to-date and accurate information.
8. The implementation of conservation lands is timely, certain and demonstrates value for money.

Conservation lands selection steps

The conservation land selection steps will be used to identify, select and secure offsets by establishing new conservation lands through the Plan's reserve or biodiversity stewardship site program. The order of these steps reflects spatial and ecological priorities to meet the Plan's offset targets and secure a strategic conservation outcome in the Plan Area within the Cumberland subregion.

The department acknowledges that it may be challenging to meet some of the offset targets in the Plan Area as many of the targeted communities and species have limited extent or habitat remaining in the Cumberland subregion. Rather than committing to a reduced offset target, the Plan allows flexibility in reaching those targets through the conservation lands selection steps.

The conservation land selection steps will guide effective and flexible implementation of the conservation program to 2056 by allowing offsets to be secured outside the Plan Area when they can't be secured from within; and allowing for offset substitutes in cases where like-for-like species and threatened ecological community offsets are unlikely to be secured.

The ecological and spatial criteria that determine the order of selection steps, in addition to the offset requirements for substitutes (Box 4) has been developed according to the limitations provided in the Biodiversity Conservation Regulation 2016 (NSW) but refined to prioritise the biodiversity and connectivity of the Cumberland subregion. Retaining presence of species in the Cumberland or adjacent subregions is prioritised. The threatened ecological community targets are likewise prioritised to within the Plan's strategic conservation area, but many of these are already restricted to within the Cumberland subregion and its immediate surrounds.

In addition to the establishment of new conservation lands, the NSW Government will seek to acquire direct species credits in accordance with the selection steps and offset requirements to meet the Plan's commitments for target species. This will ensure that offsets can be secured for threatened species as a priority, if habitat does not become available as a new conservation land.

The department will establish formal agreements with delivery partners to secure offsets, including conservation lands and will be responsible for ensuring delivery partners comply with the proposed steps. The Biodiversity Conservation Trust will follow these steps when implementing the Plan's biodiversity stewardship site program. The department must also follow these steps when developing reserve proposals with future land managers.

These steps will be assessed as part of the five-yearly review for implementing the Plan and updated if found not effective in delivering the conservation program objective and targets.

Conservation lands selection steps

1) Secure offsets from priority areas within the Plan's strategic conservation area, with a preference for (in order):
   a) target TECs[7] with the greatest impact, based on the 2019 impact assessment (Cumberland Plain Woodland, Shale Sandstone Transition Forest, River-Flat Eucalypt Forest)
   b) target TECs that have the highest percentage cleared status (as identified in the NSW BioNet Vegetation Classification database for the corresponding PCTs)
   c) target TECs or species habitat where there is a shortfall, based on offset reconciliation accounting (this includes sites with restoration potential)
   d) areas that provide potential habitat for target species (identified in the Plan) or for the following EPBC Act-listed key species:
      i) Grey headed flying fox
      ii) Regent honeyeater
      iii) Green and Golden Bell Frog
   e) areas with additional conservation benefits (that is, connectivity; riparian habitat; refugia for threatened species; and adjacency to existing protected areas).
2) Secure offsets from elsewhere within the Plan's strategic conservation area following the same ecological criteria specified in Step 1.

Priority areas will be determined during implementation and will include:

- presence of target PCTs
- presence of larger areas of remnant native vegetation
- presence of species habitat hotspots
- presence of important species populations
- presence of habitat for most impacted species
- areas avoided for biodiversity within the nominated areas
- areas owned by Office of Strategic Lands, the NSW Government or local government
- areas adjacent to already protected land (for example, biobanking sites and reserves for biodiversity purposes such as national parks or for other existing offsets)
- land that enables connectivity through the landscape.

The following steps only apply to the Biodiversity Stewardship Site program and are subject to the Plan's offset requirements:

1) Secure target TECs outside the strategic conservation area but within the Cumberland subregion or adjacent subregions. Alternatively, as a last option, anywhere else they occur in NSW, following the ecological criteria identified in step 1.
2) Secure species offset locations or area of habitat for target species[8] according to the offset requirements in Box 3.
3) Secure alternate native vegetation according to the offset requirements in Box 4.

[7] Target TECs are those TECs with a direct offset target in the Plan

[8] Target species are threatened species with a direct offset target in the Plan

Box 4. Offset requirements

Threatened ecological communities:

1. Alternate offsets can only be used once appropriate steps have been taken to obtain target TECs (including all like-for-like credits[9] that make up the relevant TEC)
2. A maximum of 20% of the Plan's cumulative offset targets for TECs can be secured outside of the Cumberland subregion over the life of the Plan (including either like-for-like credits or alternate offsets).
3. Where like-for-like offsets for the impacted TEC cannot be secured, preference should be for plant community types of the same Class first, then of same Formation, to those in the target TEC. Plant community types that make up an alternate offset must also be part of a TEC.
4. Spatial preference should first be the Cumberland and adjacent subregions—then the Sydney Basin bioregion—then anywhere in NSW

Species:

5. Direct acquisition of offsets for targeted species from start of Plan implementation (Year 1). Offsets need to be sourced from within the Cumberland subregion and adjacent subregions
6. If at Year 5, offset targets for critically endangered or endangered species have not been met, the direct purchase of offsets for the same species can be secured from anywhere in NSW
7. If at Year 10, no offset locations for critically endangered or endangered species have been identified, the program can consider the implementation of conservation actions[10] for these species
8. If at Year 10, offset targets for endangered species have not been met, the direct purchase of offsets for the same species can be secured from anywhere in NSW
9. If at Year 15, no offset locations for endangered species have been identified, the program can consider the implementation of conservation actions for these species
10. If at Year 15, offset targets for vulnerable species have not been met, the direct purchase of offsets for the same species can be secured from anywhere in NSW
11. If at Year 20, the conservation program is still not on track to meet targeted species offsets, the program can consider the implementation of conservation actions for any remaining at-risk species
12. If at Year 30, the conservation program is still not on track to meet targeted species offsets, direct purchase of offsets for any species of the same Kingdom and of the same or higher threat status within the Cumberland or adjacent subregions is permitted

[9] As defined under the *Biodiversity Conservation Regulation 2017*

[10] As defined under the *Biodiversity Conservation Regulation 2017*

Reconciliation of offsets and impacts

The Plan's evaluation program will monitor and report on the Plan's progress in delivering offsets and will include an ongoing reconciliation accounting process to reconcile the establishment of conservation lands through reserves or direct purchase of credits with development impacts throughout the life of the Plan to 2056.

The reconciliation accounting process will provide a reliable mechanism to facilitate reporting on the Plan's targets and commitments and inform the selection of offsets sites. It will also be used to determine when adaptive management steps may be required if development impacts are exceeding the delivery of conservation lands.

Reconciliation outputs will be provided to the Plan's executive implementation committee to support decision making and will inform evaluation and reporting on the Plan's outcomes and commitments. Quarterly updates will be provided to the executive implementation committee via a tracking spreadsheet.

Collecting data on offsets

In accordance with the *Draft guidelines for planning authorities* (EES, 2019), the department has assessed biodiversity impacts, measured in credits, to inform the offset targets under the Plan. The offset target methods used for determining offsets under the Plan is described in the section Addressing impacts (page 20).

The department proposes to purchase and retire biodiversity credits from biodiversity stewardship sites and creating or extending reserves to offset the impacts of development. Biodiversity assessments will be undertaken as part of the process of creating biodiversity stewardship sites. Additional offsets secured through the Plan will include direct purchase of species credits where appropriate and supporting management actions such as threat management, community education and research.

The reconciliation accounting process will track progress on achieving the Plan's offset targets for species and threatened ecological communities. While not required to specifically meet the Plan's offset commitments, monitoring the acquisition of credits will also form part of evaluating progress towards the Biodiversity Certification Assessment Report (BCAR) ecosystem credit balance.

If offsets are not being adequately secured for the Plan's respective TEC and species targets, it will trigger a response to prioritise those offsets through the reserve, biodiversity stewardship agreement or ecological restoration programs (see Step 1b in the section 'Conservation lands selection steps').

Collecting data on impacts

As part of the reconciliation accounting process, the evaluation program will track delivery of housing development and transport infrastructure in the nominated areas.

Housing data will be collated from the department's existing Sydney Housing Monitor and Greenfield Housing Monitor which gathers and publicly reports live data on estimated dwelling potential, number of lots sold and available, and the number of completed dwellings in released and rezoned precincts. Similarly, transport infrastructure development will be tracked by Transport for NSW and reported regularly to the department.

This data will be incorporated into the Plan's evaluation program via the reconciliation tracker to ensure that the delivery of the conservation program remains ahead of development. The tracker and corresponding data will be used to inform decision making in relation to program delivery, reporting and adaptive management, where necessary.

Adaptive management steps for offsets

Adaptive management may be required in the case that offsets are not being secured in line with development. Adaptive management steps have been developed to provide certainty as to how this would occur. The Plan's executive implementation committee is triggered to consider the adaptive management steps when the total offsets secured are less than 80% of the total offset liability to that time.

How the Plan's offset liability is determined

The amount of offset liability would be determined using a ratio of 3.5:1 applied to the total area in hectares of native vegetation cleared in certified, urban-capable land. This will apply an average ratio for tracking purposes to assist with decisions on adaptive management. This ratio will be reviewed for its effectiveness as part of the Plan's regular reviews.

The offset liability ratio has been determined based on the Plan's offset target method, which applied a higher ratio to impacted native vegetation of higher condition or threat status to determine the amount of offset target for each protected matter (see Addressing impacts on page 20). The offset liability ratio differs in that it applies an average ratio across all the Plan's impacts.

Importantly, this would give a total amount of native vegetation (in hectares) to be offset—not an amount for each impacted threatened ecological community or species. This method aligns with the strategic nature of delivering the Plan's conservation program, while ensuring that the executive implementation committee can maintain oversight over whether the Plan is on track in delivering offsets and apply adaptive management when required.

The amount of offset secured versus the Plan's offset liability to that time will be determined through the reconciliation accounting process.

The executive implementation committee will retain responsibility for overseeing adaptive management steps. The steps that will be considered and implemented until a balance has been achieved are:

1. property acquisition by agreement
2. compulsory acquisition of property
3. land use planning responses to development.

Each adaptive management step is outlined below.

Timing for adaptive management steps

Adaptive management steps will not be considered in the first five years of the program to allow for time for the initial set up and implementation of the Plan. However, in the case that offsets are significantly lagging within the first five years, the executive implementation committee can decide to initiate them earlier, if there is an agreed reason to do so.

Where the Plan's offsets secured are less than 80% of the offset liability after Year 5, the executive implementation committee would be triggered to consider adaptive management steps, commencing with voluntary acquisition (property acquisition by agreement).

There would be at least another three years before the final adaptive management step (land use planning responses) would be considered if offsets secured are still less than 80% of the offset liability. This step would be considered not earlier than Year 8.

Land use planning responses will be in place until the offsets secured can contribute to a minimum of 80% of the Plan's offset liability to that time.

The adaptive management steps (starting from 1 to 3) are reconsidered on a three-yearly basis from the time the Plan's offset secured reaches 80% of its liability. Figure 22 outlines the adaptive management steps for offsets to be implemented to ensure the Plan stays on track.

How land acquisition will work

Land identified as suitable for conservation could be prioritised for acquisition if offsets are not meeting the staged delivery of housing and infrastructure. A land acquisition framework is being developed to ensure transparency and fairness for landholders, and to ultimately deliver the offsets required under the Plan (Commitment 8, Action 12).

Generally, the Plan's acquisition program will have a phased process, reflecting the long-term duration of the Plan. However, if acquisition is triggered through the adaptive management steps described above, a more targeted approach may be used—such as through 'property acquisition by agreement' or by compulsory acquisition. These measures will only be used when offsets are not tracking to the established targets, and when other means to acquire land voluntarily is not successful. Box 5 outlines the various types of acquisition methods.

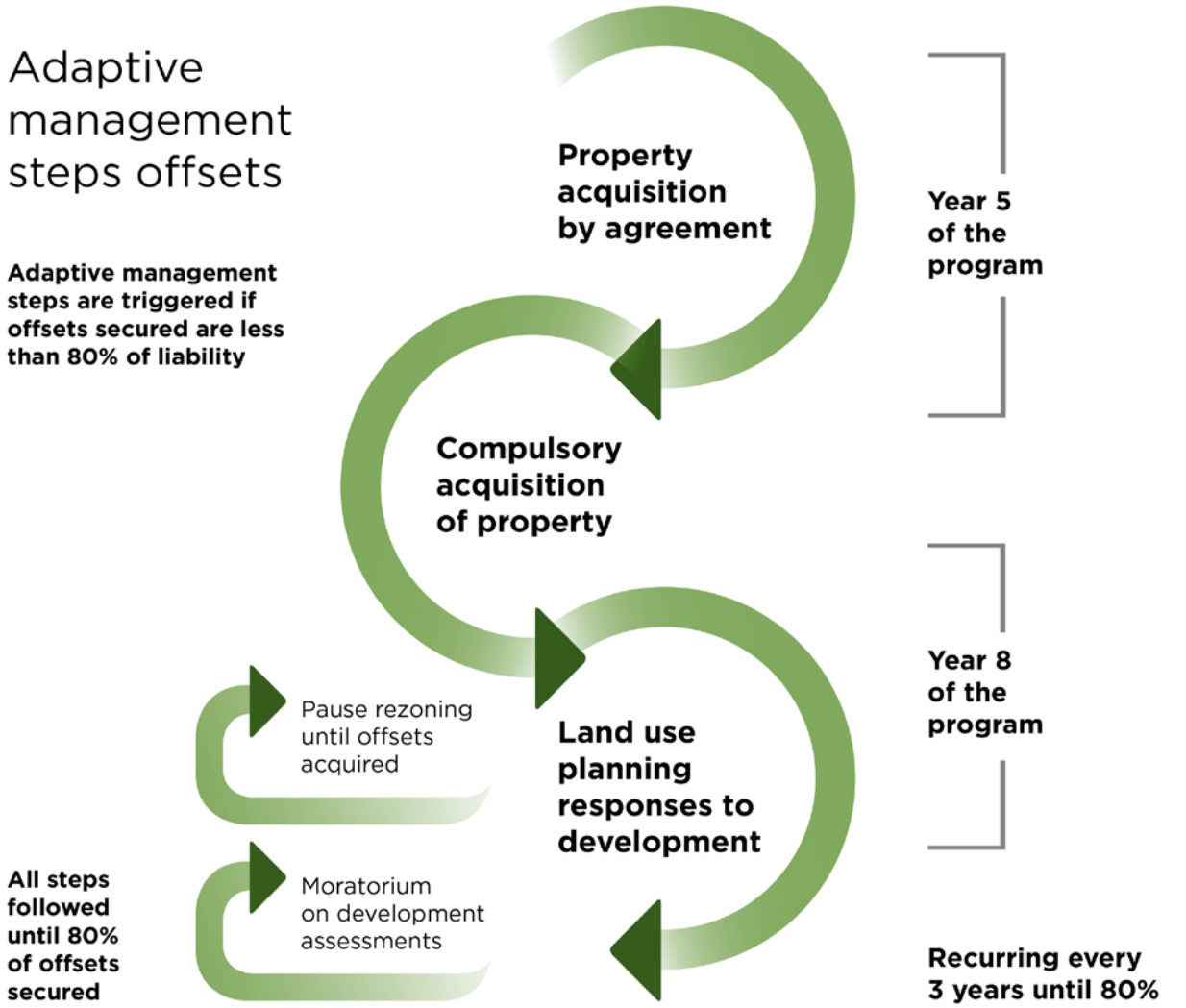


Figure 22: Adaptive management steps for offsets

The role of the Office of Strategic Lands

The Office of Strategic Lands' primary role is administering the Planning Ministerial Corporation and managing the Sydney Region Development Fund. The Office of Strategic Lands' functions include acquiring land and transferring it to other state and local government agencies to achieve public benefit outcomes, such as conservation and open space.

The Office of Strategic Lands is proposed to be the primary delivery partner for land acquisition for new reserves and for additions to existing reserves under the Plan. An agreement will be established with Office of Strategic Lands, outlining Office of Strategic Lands' role in negotiating with landholders and acquiring land identified for reserves during implementation of the Plan.

Methods of land acquisition

The acquisition model for the Plan proposes a mix of mechanisms for acquiring land. These are outlined in more detail in Box 5. It is proposed that all properties the Office of Strategic Lands identifies for acquisition are acquired through voluntary agreement (market purchase or active acquisition) unless the adaptive management steps for offsets are triggered. Where the department may consider a more targeted approach, the community and key stakeholders would be consulted before a decision was made.

Other key delivery partners

The National Parks and Wildlife Service and other potential reserve managers, such as local councils and community-based nature organisations, are critical partners in determining sites for proposed reserves and properties for acquisition.

Box 5. Proposed land acquisition mechanisms

Market purchase
Land would be purchased on a voluntary basis through a negotiated sale with the landholder. The Office of Strategic Lands would pay the market value of the land.

Active acquisition

The Office of Strategic Lands would actively engage with landowners and express an interest to purchase their land through local council meetings or by door-knocking. If a landowner decided to sell, open negotiations with the Office of Strategic Lands would commence.

Property acquisition by agreement

Where land is identified for acquisition, the Office of Strategic Lands would contact the landowner and organise a meeting to explain the process, along with the landowner's rights and obligations. The Office of Strategic Lands would then arrange a valuation of the land and encourage the landowner to seek an independent valuation.

Once the Office of Strategic Lands made initial contact with the landowner, a minimum six-month period to reach an agreement would begin.

Compulsory acquisition

Compulsory acquisition is a statutory process under the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). The Act sets out the process the relevant agency must follow when it is necessary to acquire land using a compulsory process. The statutory process also provides the means for resolving disputes around the amount of compensation payable to the landowner.

Land use planning responses relating to development

If offsets are not keeping pace with development impacts and steps to address this imbalance through acquisition mechanisms have left a shortfall, the department, under the direction of the Plan's executive implementation committee will use the NSW planning system to manage development decisions. The planning system enables land use planning responses to development if offsets are not being secured at the rate required.

Planning responses could include:

1. pause the rezoning of remaining precincts in the nominated areas, until sufficient offsets acquired
2. if rezoning of all nominated areas has occurred, place a moratorium on development assessments being determined within the nominated areas via an amendment to the Environmental Planning and Assessment Regulation 2000 (NSW).

The planning responses will remain until the offsets secured can contribute to a minimum of 80% of the Plan's offset liability to that time.

Delivery partners

The Plan's conservation program is wide-reaching yet targeted to meet the commitments and outcomes of the Plan. Its implementation will be supported by forming partnerships with key delivery agencies and organisations. Delivery partners have been identified for the full suite of commitments and actions specified in this Sub-Plan. Table 4 to Table 6 give more details about roles and responsibilities for the Plan's implementation and delivery partners.

Formal agreements will be developed with key delivery partners prior to implementation of the Plan, including with the Biodiversity Conservation Trust to deliver biodiversity stewardship agreements, National Parks and Wildlife Service to establish and manage reserves, and Office of Strategic Lands to acquire land for reserves.

Table 4: Delivery partners for conservation lands

Delivery partners	Role
Department of Planning, Industry and Environment	The department is the approval holder responsible for implementing the Plan.
National Parks and Wildlife Service	National Parks and Wildlife Service will be the long-term manager of new reserves and national parks created under the *National Parks and Wildlife Act 1974* (NSW).
Office of Strategic Lands	Office of Strategic Lands will be the key delivery partner for land acquisition for reserves established under the Plan
Biodiversity Conservation Trust	The Biodiversity Conservation Trust will deliver the biodiversity stewardship program under the Plan.
Councils	Councils will play a role in establishing council reserves and ensuring conservation is embedded in local planning controls. This includes following section 9.1 Directions in considering any Planning Proposals submitted to them.
Community organisations	Community organisations could manage smaller parcels of conservation lands.
Private landholders	Private landholders to enter into biodiversity stewardship agreements to manage conservation on their land.

Table 5: Potential delivery partners – managing threats to biodiversity

Delivery partners	Role
The department	Managing weeds—identify sites for conservation and coordinated weed control Climate change—manage climate change programs, provide funding to research organisations and coordinate planning outcomes
Office of Strategic Lands	Managing weeds—obtain Biodiversity Stewardship Agreements and implement weed management actions Managing emergent pest species—control pests on conservation lands until they are transferred to long-term land managers
Private landholders	Managing weeds—control weeds as part of their stewardship agreement. Managing pests—manage identified pest species on their sites
Councils (both general councils and the county council)	Managing weeds—control weeds in areas near conservation lands Managing emergent pest species—control pest animals on council land Climate change—integrate connectivity considerations and measures to manage the effects of urban heat islands in designs of precincts and the urban matrix
Private land managers	Managing emergent pest species—control pest animals on their lands with support and advice from Local Land Services (LLS)
Local Land Services	Managing weeds—assist in implementing weed control efforts outside conservation lands Managing emergent pest species—coordinate landscape-scale pest control programs across multiple land tenures Climate change—coordinate grants to restore areas near and adjacent to reserves and stewardship sites
Biodiversity Conservation Trust	Managing weeds, bushfire risk and emergent pest species—has a compliance role in ensuring that fire, weeds and feral pests on stewardship sites are managed and monitored in accordance with site management plans
National Parks and Wildlife Service	Managing bushfire risk—undertake controlled burning on the NSW National Parks estate and implement the majority of the Plan's fire management program to reduce its threat to biodiversity Managing emergent pest species—control pests in conservation lands that are gazetted as national parks or other reserves Managing weeds—control weeds in gazetted conservation lands
Fire and Rescue NSW	Managing bushfire risk—provide fire and rescue services across NSW
NSW Rural Fire Service	Managing bushfire risk—provide volunteer fire and emergency services
Research organisations	Climate change—undertake a research program into the impacts of climate change on threatened and susceptible biodiversity areas

Table 6: Proposed education and engagement partners

Potential partners	
Environment and conservation groups	Landcare and Bushcare groups Wildlife organisations
Aboriginal organisations	Deerubin Aboriginal Local Land Council Gandangara Local Aboriginal Land Council Tharawal Local Aboriginal Land Council
Education	Universities Research agencies Department of Education TAFE
State and local government	Councils in the Plan Area Biodiversity Conservation Trust Office of Strategic Lands Local Land Services Royal Botanic Gardens and Centennial Park Trust

Compliance

An effective compliance program will ensure that Commonwealth and NSW statutory requirements are met and that the Plan complies with relevant planning instruments.

Roles and responsibilities for compliance fall across all levels of government and multiple agencies. The implementation and assurance framework and evaluation program set out the key arrangements to ensure all activities covered by the Plan are effectively carried out, monitored and reported.

Compliance working group

The department will establish a compliance working group comprising the department, councils and other relevant stakeholders (Commitment 28, Action 1). Under the guidance of the Compliance Working Group, the department will prepare a Compliance Strategy that will:

- identify relevant compliance mechanisms
- set out compliance monitoring and auditing priorities and processes
- set out a decision-making framework for taking compliance action
- set out procedures and protocols for taking compliance action
- identify roles and responsibilities for compliance (Commitment 28, Action 2).

Compliance officers

Local councils will play a key compliance role in ensuring that the conservation measures are implemented in accordance with the Plan. The Plan commits to providing funding for at least three council-based compliance officers to ensure compliance with the conservation program (Commitment 28, Action 3). These officers will work closely with council rangers to monitor illegal dumping and vegetation clearing.

Compliance officers will assist in coordinating investigations and remediation activities in conservation areas in the Plan Area, as well as buffer zones, asset protection zones and other areas. They will seek to identify threatening activities that may affect the Plan's conservation outcomes and will have the authority to impose warnings and fines on transgressors, where the law is broken under relevant legislation.

Monitoring compliance with regulatory approvals

Development in nominated areas and major infrastructure corridors must be undertaken in accordance with the Plan and any conditions of approval.

Development will be staged over the life of the Plan, and in some cases may require further assessment and approval through applicable NSW legislation.

Monitoring compliance with regulatory approvals under the EPBC Act and BC Act will be carried out to ensure that development is consistent with the endorsed Plan (EPBC Act approval) and certification order (BC Act approval) (Commitment 1, Action 2).

Reporting on compliance

Reporting on compliance will be an important part of the evaluation program to ensure potential compliance breaches are adequately managed in the conservation areas. Compliance reporting will be included in all facets of the reporting framework including regular reporting to the executive implementation committee, yearly updates to be published as well as the independent five-yearly review (Commitment 27, Actions 3 and 4).

Evaluation Program

A tagged koala released through the Wollondilly Koala project

Evaluation program

About the evaluation program

Implementing the Plan will require regular monitoring against the environmental, social and economic outcomes, evaluation to inform the use of adaptive management and public reporting to government and the community on progress in delivering the conservation program and achieving its outcomes.

Formal agreements such as memorandums of understanding will be established with delivery partners and include requirements relating to the evaluation program including monitoring (data collection, management and sharing arrangements) and reporting.

The evaluation program outputs will be used to inform the executive implementation committee, adaptively manage delivery of the Plan and deliver reporting on the Plan.

The evaluation program will be finalised in consultation with key stakeholders. It will be used to inform decisions made by the executive implementation committee over the life of the Plan (Commitment 27, Action 1). Figure 23 outlines the key aspects of the evaluation program.

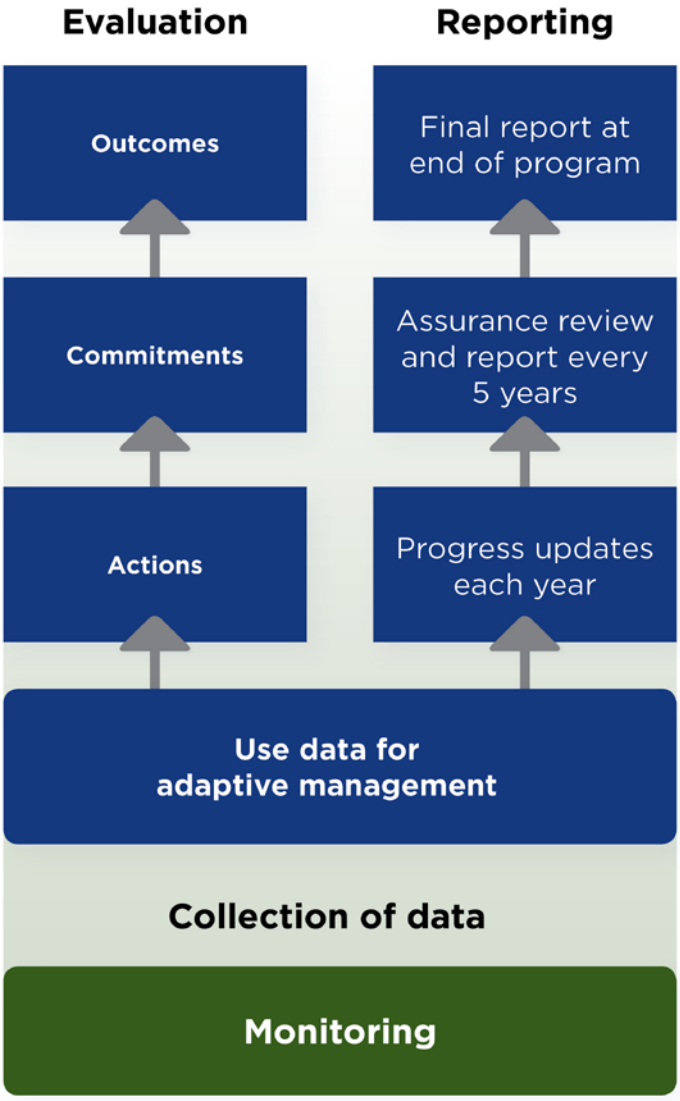


Figure 23: The evaluation program

Monitoring

The evaluation program will collect, assess and store relevant data to evaluate and report on the progress of the Plan.

The department will firstly collect benchmark data that will be used to evaluate the effectiveness of the Plan over time. The benchmark data will be collected through:

- aerial imagery monitoring and analysis
- existing habitat modelling for matters of national environmental significance and threatened species
- on-ground Biodiversity Assessment Method vegetation surveys
- targeted threatened species surveys
- rapid assessments
- literature reviews
- expert reports
- existing information from NSW Government websites such as NSW BioNet and the SEED portal (NSW Government, 2020).

Throughout the life of the evaluation program, the department will assess specific locations, threatened entities and species habitat components (including connectivity) to ensure the Plan is delivering on its commitments, actions and outcomes. Future assessment of biodiversity as part of the evaluation program will include:

- aerial photography interpretation
- conducting Biodiversity Assessment Method through business as usual monitoring practices for Biodiversity Stewardship Agreements/reserves
- conducting other types of on-ground assessment
- updating species habitat predictive modelling
- establishing agreements with delivery partners to provide relevant data.

This data will be compared to the baseline data, and progress towards various outcomes will be tracked over the life of the Plan to 2056.

Evaluation

The effectiveness of the Plan's actions in achieving the environmental, social and economic outcomes will be evaluated on an ongoing basis to meet reporting requirements, and for transparency and accountability with the approval agencies, stakeholders and the community.

It will also inform any necessary adaptive management decisions for the implementation of the conservation program.

Evaluation questions

Monitoring for the evaluation program will be driven by evaluation questions, which have been developed to ensure that data relating to outcomes is collected and used to inform the evaluation program.

Evaluation questions have been prepared by the department and aim to reveal the cause of any shortfall in meeting conservation targets and prompt the use of adaptive management to ensure successful delivery of the conservation program. The evaluation questions will be used by the

department to prepare evidence-based advice to the executive implementation committee and adaptively manage the Plan. The evaluation questions will be finalised in consultation with key stakeholders and approved by the executive implementation committee. For more information on the evaluation questions, see Appendix F. Draft evaluation questions.

Reporting

The NSW Government is committed to publicly available and regular assurance reporting. This will include a progress update each year and an independent review of the Plan every five years. The NSW Government will also collate finer-scale program and project reporting from the relevant delivery partners more frequently to support implementation decisions including adaptive management decisions made by the executive implementation committee. Reporting templates will be developed so that reports from delivery partners are consistent. This will streamline the data collation and reporting processes and feed directly into the adaptive management process.

Annual update

The department will provide an annual update on the delivery of the Plan's commitments and actions, with feedback from the evaluation questions and report on the conservation program's revenue and expenditure. In addition, the department will more frequently collate finer-scale program and project reporting from the relevant delivery partners, in order to support adaptive management over the life of the Plan. This will be provided to the executive implementation committee (see Commitment 4, Action 1). Final reporting requirements and timeframes will be confirmed with when the draft Plan is approved.

Independent review

The NSW Government will commission a comprehensive, independent review on the status of implementation of the Plan and its outcomes every five years over the life of the Plan.

The results of the review will be submitted in a report to the NSW Minister for Planning and Public Spaces and provided to the NSW Minister for the Environment and the Commonwealth Minister for the Environment.

This report, as well as the annual updates, will be made publicly available on the department's website and remain available through the life of the Plan.

Adaptive management for the Plan

Adaptive management is critical to effectively achieving the Plan's outcomes. It will allow for management of spatial and temporal uncertainty across the approximately200,000-hectare Plan Area and throughout the life of the Plan to 2056.

Strong risk management and implementation planning will manage most conservation program risks. However, not all changes can be accurately forecast. These might include changes in economic and social variables; unpredicted climate variation; the changing conservation status of individual species or plant communities; local events such as fires, floods and disease; changes in administration; new technology and the roles and responsibilities of delivery agencies and key stakeholders. The evaluation program will identify these large-scale risks up front and continually monitor changes.

The outcomes and commitments of the Plan's conservation program will be fixed, while the actions may be adaptively managed over time to respond to changes such as those outlined above.

Adaptive management will use the data sourced through monitoring and the findings of program evaluation to determine whether actions need to be revised to more effectively achieve the Plan's commitments and outcomes. Importantly, where evaluation suggests a commitment is not tracking as planned, it will trigger a review and potential modification to the required action or implementation of the action.

Ongoing tracking of the activities led by delivery partners will be managed as part of the evaluation program. Where the evaluation program indicates a commitment or outcome is not tracking in the desired way, this will trigger a review of the program or project activity in greater detail. This will be carried out by the relevant delivery agency for that particular project or program, in partnership with the department.

To ensure the Plan's commitments continue to deliver to 2056, changes to the proposed actions could be made in cases where:

- targets are not being met
- the conservation program logic does not adequately translate into the desired outcomes
- external factors arise that affect the assumptions, logic or delivery of the Plan.

Adaptive management will be applied across the entire conservation program. Possible remediation actions to address shortfalls in achieving Plan outcomes or to remedy implementation challenges are outlined below. However, this list is indicative only and any adaptive management measures required will be informed by the Plan's evaluation program.

Remediation actions to address shortfalls in offsets include:

- encourage uptake of conservation lands by:
  - incentivising landowners to enter into Biodiversity Stewardship Agreements
  - engaging with the community and landowners
  - working with delivery partners to strengthen the effectiveness of the Biodiversity Stewardship Agreement and reserve programs
- invest in active restoration technologies and projects
- manage for new and emerging threats to biodiversity
- undertake research to better understand how species and communities respond to change, and implement relevant management practices
- review data needs and update conservation priority mapping as required.

Appendices

Cumberland Plain Land Snail is a threatened species that is endemic to Western Sydney

Appendix A. Commitments and actions

Development actions

Commitments	Actions	Timing
Commitment 1 Development will be undertaken in accordance with the Plan and any conditions of approval. This applies to the following classes of actions: • urban and industrial • infrastructure • intensive plant agriculture • major infrastructure corridors **Commitment 1.1** Essential infrastructure in non-certified land will be implemented consistent with the Plan's Essential Infrastructure Guidelines.	1. Integrate the Plan into the planning delivery framework for the nominated areas through mechanisms including zoning, development controls, ministerial directions and development guidelines (Commitments 2, 5, 7, 8, 14, 15). 2. Monitor the implementation of urban, infrastructure, major transport and agribusiness development to ensure it is consistent with the Plan. This includes the Plan's: • commitments for avoiding, minimising, mitigating and offsetting impacts • reporting and compliance requirements • class of action approvals (EPBC Act); Strategic Biodiversity Certification Order (BC Act). 3. Introduce a planning control to require public authorities to notify the department of any development or activity in non-certified land, including how the Essential Infrastructure Guidelines have been considered. 4. Notify public authorities of their obligations under the EPBC Act as described in the Essential Infrastructure Guidelines. 5. Implement the Essential Infrastructure Guidelines including: • monitoring the impacts of development on non-certified land • monitoring compliance with the avoidance, mitigation and offset commitments under the Plan, relevant to these Guidelines • applying further controls in the planning system if the Plan's avoidance targets are not being met and to limit impact on areas avoided for biodiversity • providing annual updates to Department of Agriculture Water and Environment • undertaking extension and training activities for public authorities and local councils • undertaking monitoring and audit of infrastructure construction and operation as required, to ensure adequate mitigation measures are being applied.	Life of Plan

Conservation program

Commitments to avoid and minimise impacts

Commitments	Actions	Timing
Commitment 2 Avoid and minimise impacts from urban, industrial and infrastructure development to at least 4,315[11] hectares of land. This target includes avoiding 3, 670 hectares of native vegetation comprising: • 2,735 hectares of native vegetation avoided for its biodiversity value • 935 hectares of native vegetation avoided for other purposes including riparian corridors and steep slopes **Commitment 2.1** The avoidance target of 4,315 hectares includes avoiding up to the following areas of EPBC Act-listed threatened ecological communities: • 1,945 hectares of Shale Sandstone Transition Forest • 95 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest • 170 hectares of River-Flat Eucalypt Forest (subject to listing) • 30 hectares of Coastal Swamp Oak (Casuarina glauca) Forest • 25 hectares of Cooks River Castlereagh Ironbark Forest	1. Introduce a planning provision requiring that the certified - urban capable land in the precinct plans are consistent with the areas of certified land and avoided land identified in the Plan. 2. Apply environmental conservation zoning to all areas avoided for biodiversity purposes, riparian corridors and steep land. 3. Apply planning controls relating to essential infrastructure development by public authorities on non-certified land in the nominated areas. 4. Monitor the impacts of development on non-certified land through the Plan's reconciliation accounting process 5. Apply further controls through the planning system if the Plan's avoidance targets are not being met 6. When preparing new precinct plans for nominated areas, ensure that asset protection zones are located wholly within certified - urban capable land.	Actions 1,2,3: Before start of Plan Actions 4-6: Life of Plan as precincts are designed.

[11] The total area of avoided land at the start of the Plan is 4,795 hectares. The avoidance target has reduced this figure by 10% to allow for potential future development of essential infrastructure in non-certified land. E2 zoning will be applied to all avoided land in the nominated areas.

Commitments	Actions	Timing
Commitment 2.2 The avoidance target of 4,315 hectares includes avoiding up to the following areas of BC Act-listed threatened ecological communities: • 2,135 hectares of Shale Sandstone Transition Forest • 475 hectares of Cumberland Plain Woodland • 170 hectares of River-Flat Eucalypt Forest • 90 hectares of Swamp Oak Floodplain Forest • 30 hectares of Shale Gravel Transition Forest • 30 hectares of Cooks River Castlereagh Ironbark Forest • 20 hectares of Moist Shale Woodlands **Commitment 2.3** The avoidance target of 4,315 hectares includes limiting cumulative direct impacts over the life of the Plan from essential infrastructure to the EPBC-listed Shale Sandstone Transition Forest TEC within non-certified land to no more than: • 20 hectares in the Wilton Growth Area • 20ha in the Greater Macarthur Growth Area **Commitment 2.4** Prioritise the avoidance of impacts from essential infrastructure on non-certified land to: • known populations of the following threatened flora species: o *Grevillea parviflora* subsp. *parviflora* (Small-flower Grevillea) o *Persoonia bargoensis* (Bargo Geebung) o *Persoonia nutans* (Nodding Geebung) o *Genoplesium baueri* (Yellow Gnat-orchid)		

Commitments	Actions	Timing
o *Pimelea spicata* (Spiked Rice-flower) o *Pultanea parviflora* • important koala corridors within the Wilton and Greater Macarthur Growth Areas to maintain their integrity		
Commitment 3 Avoid and minimise impacts to threatened ecological communities, species and their habitat within major infrastructure corridors in the Plan's nominated areas. This includes avoiding where possible: • Areas of high biodiversity value (defined by the Plan's avoidance criteria at Appendix B. Avoidance criteria) • Areas of potential habitat connectivity, particularly vegetation in riparian corridors, for the following species: o Eastern Pygmy Possum o Green and Golden Bell-Frog o Spotted-tailed Quoll o Squirrel Glider o Yellow-bellied Glider • Known flora populations within the OSO and M7/Ropes Crossing Link Road corridors, including: o *Dillwynia tenuifolia* o *Grevillea juniperina* subs. *Juniperina* o *Pultanea parviflora* o *Persoonia nutans* • Outer Sydney Orbital waterway crossings minimises structures within riparian areas, waterway re-alignments, and bilk earthworks on adjacent floodplain areas.	1. Transport for NSW will consider avoidance of areas of high biodiversity value including habitat for identified species during strategic planning phase of the project to understand potential impacts. a. Where an action cannot feasibly or practically avoid impacts on an area of high environmental value, these impacts should be minimised as far as possible using design refinements to reduce overall impact. 2. Transport for NSW will include avoidance of high environmental value areas and threatened species as well as the costs of offsets into the evaluation of the route options (for example multi-criteria analysis) during the strategic planning phase. 3. Transport for NSW will prepare a Clearing Reconciliation Report for the department and executive implementation committee on vegetation cleared and adjustments to transport corridor boundaries identified through the NSW State Significant Infrastructure approval (or equivalent) for each transport project. This will include specific reporting on avoidance achieved, within the mapped or protected corridors identified in this Plan, for: a. EPBC Act-listed species or ecological communities b. BC Act matters. 4. The department will use this information to track impacts and adjust offset requirements through the Plan's reconciliation accounting process. 5. Adjustments to the Plan's projected impacts to biodiversity (including MNES—matters of national environmental significance) and offset requirements will be published regularly through the Plan's annual updates and five yearly reviews.	Life of Plan

Commitments	Actions	Timing
Commitment 3.1 Where an action cannot feasibly or practically avoid impacts on an identified area, these impacts are to be minimised as far as possible. Minimisation can be achieved by refining design elements to reduce the overall impact. **Commitment 3.2** Transport for NSW will be responsible for determining the area of avoidance achieved for each of the relevant BC Act and EPBC Act matters using: • the estimated construction footprint as shown in the EIS for each infrastructure corridor • the Plan's data and mapping for threatened ecological communities, species and their habitats. **Commitment 3.3** The strategic biodiversity certification (BC Act) for each of the infrastructure corridors will only be activated once the areas avoided and the areas to be developed have been reported (as per Commitment 3.2).	6. Where areas have been avoided for biodiversity purposes, the department will apply planning controls, including environmental conservation zoning.	
Commitment 4 Avoid and minimise impacts to threatened ecological communities, species and their habitat in the sections of the four major infrastructure corridors outside the nominated areas but within the Plan Area in accordance with the: • major infrastructure corridors class of action description • Biodiversity Assessment Method (BC Act)	1. To avoid and minimise impacts to threatened ecological communities, species and their habitat Transport for NSW will: • undertake surveys to confirm biodiversity values and MNES using the BC Act Biodiversity Assessment Method (or equivalent), during the strategic planning phase of the project to understand potential impacts • include avoidance of threatened ecological communities, species and their habitat as well as the costs of offsets into the evaluation of the route options (for example multi-criteria analysis)	Life of Plan

Commitments	Actions	Timing

Commitment 4.1
This includes consideration to avoid and minimise impacts to threatened species, populations and communities as a result of tunnel construction activities in major infrastructure corridors and to minimise impacts to Commonwealth Land sites including impacts to existing infrastructure and disruption to existing services.
 	
This includes avoiding disturbance to the following locations where possible:
• Known flora populations within the OSO and M7/Ropes Crossing Link Road corridors, including:
  o *Dilwynia tenuifolia*
  o *Grevillea juniperina* subs. *Juniperina*
  o *Pultanea parviflora*
  o *Cynanchum elegans*
• Protected lands within and adjacent to the proposed tunnel footprints as follows:
  o Mater Dei BioBank site within the Outer Sydney Orbital footprint near Camden
  o Registered Property Agreement site within the Outer Sydney Orbital footprint at Camden Airport
  o Metro Offset site within the footprints for the Outer Sydney Orbital and Metro Rail Future Extension near Harrington Park
• Nepean River and associated riparian corridor within the Outer Sydney Orbital footprint
• Camden Golf Club at Narellan adjacent to the footprint for the Metro Rail Future Extension
	• prepare a Biodiversity Certification Assessment Report or Biodiversity Development Assessment Report or equivalent under NSW planning and assessment legislation at the time
	• avoid and minimise biodiversity impacts in accordance with the Biodiversity Assessment Method (or equivalent)
	• report to the department and executive implementation committee on vegetation cleared and adjustments to transport corridor boundaries identified through the NSW SSI approval (or equivalent) for each transport project. This will include reporting on avoidance achieved, within the mapped or protected corridors identified in this Plan, in addition to any further impact outside of mapped corridors, for EPBC Act-listed species, populations or ecological communities.
	2. The department will use this information to track impacts and adjust offset requirements through the Plan's reconciliation accounting process.
	3. Adjustments to the Plan's projected impacts to biodiversity (including MNES) and offset requirements will be published through the Plan's annual updates and five yearly reviews.	

Commitments	Actions	Timing
• Mount Annan Botanic Gardens within the footprint for the Metro Rail Future Extension • Populations and habitat within or adjacent to the footprints for the Outer Sydney Orbital and Metro Rail Future Extension for: o *Eucalyptus benthamii* o *Pomaderris brunnea* o *Pimelea spicata* o Cumberland Plain Land Snail • Commonwealth land at: o Camden Airport o Western Sydney University (Campbelltown Campus) o 12 Werombi Road, Grasmere NSW		

Commitments to mitigate indirect and prescribed impacts

Commitments	Actions	Timing
Commitment 5 Mitigate indirect and prescribed impacts from development on threatened ecological communities, species and their habitat to best practice standards. **Commitment 5.1** This includes implementing development controls within the nominated areas to protect threatened species as prescribed in Appendix E of the Plan. **Commitment 5.2** This includes implementing development controls within the nominated areas to protect the following threatened ecological communities as prescribed in Appendix E of the Plan: • Cooks River Castlereagh Ironbark Forest (NSW and Cth) in Western Sydney Aerotropolis • Cumberland Plain Woodland (NSW and Cth) in Greater Penrith to Eastern Creek Investigation Area • River-flat Eucalypt Forest (NSW) / Coastal Floodplain Eucalypt Forest (Cth) in all nominated areas • Shale Sandstone Transition Forest (NSW and Cth) in Wilton and Greater Macarthur growth areas • Shale-Gravel Transition Forest (NSW) in Greater Penrith to Eastern Creek Investigation Area • Swamp Oak Floodplain Forest (NSW) / Coastal Swamp Oak Forest (Cth) in Greater Penrith to Eastern Creek Investigation Area and Western Sydney Aerotropolis	1. Incorporate provisions in the development control plans (DCPs) for each nominated area setting out development controls that need to be addressed by neighbourhood plans and development applications to mitigate indirect and prescribed impacts on threatened species. This includes: a. specific controls that apply to the nominated areas to mitigate indirect and prescribed impacts on specific threatened species or ecological communities or other environmentally sensitive areas as listed in Appendix E of the Plan. b. a common set of development controls to mitigate indirect and prescribed impacts across the four nominated areas that inform general biodiversity protection as listed in Chapter 15 of the Assessment Report. 2. Incorporate requirements to audit and monitor the implementation of development controls in the standard set of conditions in subdivision plans. 3. Incorporate provisions in relevant land-use plans for the nominated areas to give legal effect to specific development standards as required. 4. Provide ongoing support to Councils in the application of DCP controls within the nominated areas, including the sharing of knowledge, maps and data. 5. Introduce guidelines to be considered by public infrastructure authorities that will include the mitigation measures for indirect and prescribed impacts to biodiversity from infrastructure activities as prescribed in Appendix E of the Plan. 6. The department will conduct a survey to confirm the presence of the Green and Golden Bell Frog along Ropes Creek. 7. Consult with the relevant public land manager to minimise disturbance and impacts to threatened species listed in Commitment 5.4 including: • ensuring walking tracks and management trails in Wianamatta Regional Park are located in a way that avoids and minimises exposure of *Persoonia nutans* to human disturbance	Actions 1: Before start of Plan Actions 2-4: Life of Plan Action 5-8: Year 1

Commitments	Actions	Timing
Commitment 5.3 This includes mitigation measures to address indirect and prescribed impacts on threatened ecological communities, species and their habitat during construction and operation of infrastructure projects as prescribed in Appendix E of the Plan. **Commitment 5.4** This includes consulting with public land managers to minimise impacts to the following threatened species as prescribed in Appendix E of the Plan: • populations of *Persoonia nutans* in Wianamatta Regional Park • populations of *Pimelea spicata* on public land in all nominated areas • Macquarie Perch in Erskine Creek, Glenbrook Creek, Georges River and Cordeaux River • Green and Golden Bell Frog along Ropes Creek	• ensuring land management in potential habitat for *Pimelea spicata*, particularly mowing and slashing activities and weed management activities involving the use of herbicides, will minimise risks and maintain the species • prohibiting recreational fishing along stretches of known habitat for Macquarie Perch in Erskine Creek, Glenbrook Creek, Georges River and Cordeaux River • installing signs and/or interpretive displays at appropriate sites used for recreational fishing along Erskine Creek, Glenbrook Creek, Georges River and Cordeaux River to assist with identification of Macquarie Perch and awareness of threats • if Green and Golden Bell Frog is confirmed present along Ropes Creek, consult with land managers of the riparian corridor to ensure key habitat features are protected from development impacts and enhanced. 8. In finalising the evaluation program for the Plan, ensure the program monitors impacts of hydrological changes to high risk species and TECs, and evaluations consider feasible adaptive management responses if necessary.	
Commitment 6 Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on threatened species and their habitat. **Commitment 6.1** This includes mitigation measures to address impacts on the following threatened species during construction and operation of transport infrastructure as prescribed in Appendix E of the Plan. **Plants** • *Cynanchum elegans* • *Dillwynia tenuifolia*	1. To mitigate indirect and prescribed impacts on threatened species and their habitat Transport for NSW will, across all infrastructure corridors: • assess the impacts on biodiversity and other environmental values based on detailed design. • implement mitigation measures based on the outcomes of environmental assessment of detailed designs in accordance with published, best practice guidelines, including but not limited to, the RMS Biodiversity Guidelines. • identify potential design options for major watercourse crossings to reduce disruption to connectivity and the risk of vehicle strikes.	Action 1: Before start of Plan Actions 2,3: Life of Plan

Commitments	Actions	Timing
• *Grevillea juniperina* subsp. *juniperina* • *Persoonia nutans* • *Pultenaea parviflora* **Animals** • Cumberland Plain Land Snail • Large Bent-winged Bat • Eastern Coastal Free-tailed Bat • Eastern Pygmy-possum • Greater Glider • Green and Golden Bell Frog • Little Bentwing-bat • Southern Myotis • Spotted-tailed Quoll • Squirrel Glider • Yellow-bellied Sheathtail-Bat **Commitment 6.2** This includes mitigation measures to address impacts on the following threatened species during construction of proposed tunnels within the major infrastructure corridors: • *Eucalyptus benthamii* • *Pimelea spicata* • *Pomaderris brunnea* • Cumberland Plain Land Snail Key threats/indirect impacts that need managing are: • Hydrological disturbance • Spread of weeds • Spread of infection/disease • Soil erosion and sedimentation • Ground settling or subsidence • Disturbance to ground shelter habitat (e.g. removal of fallen logs, slashing)	• undertake ongoing monitoring of high-value environmental areas, and review and adjust mitigation measures (where practical) in response to monitoring outcomes. 2. Transport for NSW will apply further mitigation according to Biodiversity Assessment Method requirements for major transport development in corridors outside of nominated areas. 3. Transport for NSW will report to the department and executive implementation committee on mitigation measures proposed to manage impacts of each infrastructure project, including proposed techniques, timing, frequency and responsibility for implementing each measure.	

Commitments	Actions	Timing
Commitment 6.3 This includes addressing mitigation requirements of the Biodiversity Assessment Method (or equivalent) for major infrastructure corridors outside of nominated areas.		
Commitment 7 Mitigate indirect and prescribed impacts from urban, infrastructure and major infrastructure (transport) development on the Southern Sydney koala population to best practice standards and in line with the Chief Scientist Koala Report (2020).	1. Install koala-exclusion fencing between important koala habitat and certified urban capable land within Greater Macarthur Growth Area and Wilton Growth Area as identified in Sub-Plan B except where exclusion fencing is not feasible due to slope, heritage or water courses. 2. Ensure all koala-exclusion fencing is at least 3 metres from koala habitat trees. 3. In areas where exclusion fencing is not feasible, apply mitigation actions 60 metres from the koala habitat. These actions include developing controls in accordance with the Koala Habitat Protection Guidelines and including design requirements in relevant development control plans. Specific locations are identified in Sub-Plan B. 4. Install koala-exclusion fencing on both sides of Appin Road between Rosemeadow and Appin to mitigate koala vehicle strikes at roadkill hotspots. 5. Where fencing must cross existing or planned linear infrastructure such as gas and electricity transmission, consider appropriate access treatments such as gates to ensure the integrity of the koala-exclusion fencing. 6. Establish a koala working group including koala experts and relevant government agencies to determine priorities for koala conservation consistent with the objectives of the NSW Koala Strategy.	Action 1: Years 1-3 Action 2: Year 1 Action 3: Years 1-3 Action 4: Life of Plan Action 5: Year 1 Action 6: Year 1

Conserving flora, fauna and habitat

Commitments	Actions	Timing
Commitment 8 Protect a minimum of 5,475 hectares of native vegetation[12] in the Cumberland subregion to conserve biodiversity values in perpetuity in accordance with the conservation lands selection steps. **Commitment 8.1** This target includes minimum areas of the following EPBC Act-listed threatened ecological communities: • 715 hectares of Shale Sandstone Transition Forest • 575 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest • 575 hectares of Coastal floodplain eucalypt forest of eastern Australia[13] (nominated for listing) • 105 hectares of Cooks River Castlereagh Ironbark Forest • 5 hectares of Coastal Swamp Oak Forest **Commitment 8.2** This target includes minimum areas of the following BC Act-listed threatened ecological communities: • 3,170 hectares of Cumberland Plain Woodland	1. Prepare a Conservation Lands Implementation Strategy to guide the establishment of land for conservation, including: • priorities for selecting and acquiring land • targets and proposed timeframes for establishing new conservation lands • proposed conservation mechanisms for each area of priority conservation land • suitable land managers for each area of priority conservation land • a process to secure alternative areas where targets and timing cannot be met. 2. Protect up to 11,000 hectares of land in the Cumberland subregion, including at least 5,475 hectares of targeted threatened ecological communities plus non-target plant communities and cleared areas for restoration and visitor facilities. 3. Achieve the target of 5,475 hectares of native vegetation by protecting at least 75% of this area as remnant native vegetation and undertaking ecological restoration (reconstruction) on up to 25% of the target area. 4. Undertake surveys within the strategic conservation area or other avoided land prior to protecting the land to confirm plant community extent and condition and update vegetation mapping if necessary. 5. Enter into written agreements with delivery partners to set out the arrangements to protect land for conservation under the Plan, including: • roles and responsibilities	Action 1: Before start of Plan Action 2,3,4: Life of Plan Action 5: Before start of Plan Action 6,7,8: Life of Plan Action 9: Years 1-5 Action 10: Life of Plan Action 11: Year 1 Action 12: Life of Plan

[12] While there is overlap between the TEC targets listed in commitments 8.1 and 8.2, there are differences in the listings between EPBC Act-listed and BC Act-listed TECs, such as differences in approach and criteria. Therefore, the BC Act-listed TECs in commitment 7.2 incorporate targets for EPBC Act-listed TECs.

[13] The "River-flat eucalypt forest on coastal floodplains of New South Wales" was nominated for listing as a threatened ecological community under the EPBC Act in 2016. It has since been renamed as *Coastal floodplain eucalypt forest of eastern Australia*. The proposed conservation status for this ecological community is 'endangered'.

Commitments	Actions	Timing
• 1,540 hectares of Shale Sandstone Transition Forest • 450 hectares of River-Flat Eucalypt Forest • 150 hectares of Shale Gravel Transition Forest • 110 hectares of Cooks River Castlereagh Ironbark Forest • 50 hectares of Swamp Oak Floodplain Forest • 5 hectares of Freshwater Wetlands on Coastal Floodplains • <1 hectares of Moist Shale Woodland **Commitment 8.3** Track and adjust offset targets using the Plan's reconciliation accounting process and report to DAWE and EES. The Plan's cumulative offset targets for threatened ecological communities may be adjusted to account for future avoidance of biodiversity values within major infrastructure corridors.	• processes for implementation • land management arrangements, including prior to acquisition • funding arrangements • stakeholder consultation arrangements • progress reporting. 6. Protect and manage land containing targeted plant communities within the strategic conservation area by establishing: • reserves under relevant legislation including the *National Parks and Wildlife Act 1974, Crown Land Management Act 2016,* and *Local Government Act 1993* • Biodiversity Stewardship Agreements under the *Biodiversity Conservation Act 2016.* 7. Track the progress of meeting plant community and threatened ecological community targets (in hectares) through the reconciliation accounting process (Commitment 27 Action 2). 8. Adjust offset targets if required, to account for future avoidance within major infrastructure corridors (Commitments 3 and 4). 9. Establish a community engagement program to inform landholders within the strategic conservation area about the opportunities and benefits of private land conservation under the Plan. 10. Provide upfront funding for business cases and Biodiversity Assessment Method assessments to help landholders to enter into biodiversity stewardship agreements, where this investment can be recouped through the later sale of biodiversity credits. 11. Define an acquisition framework that will guide decision-making and processes to be used when acquiring land for conservation. 12. Apply acquisition clauses through relevant environmental planning instruments to land identified for future reserves under the Plan as funds become available through the program.	

Commitments	Actions	Timing
Commitment 9 Protect threatened species likely to be at risk of residual adverse impacts from development under the Plan in accordance with the Plan's conservation lands selection steps. **Commitment 9.1** This includes protecting known offset locations for the following target threatened species: Flora species • 2 offset locations for *Cynanchum elegans* • 3 offset locations for *Dillwynia tenuifolia* • 1 offset location for *Epacris purpurascens* var. *purpurascens* • 3 offset locations for *Grevillea juniperina* subsp. *juniperina* • 1 offset location for *Hibbertia fumana* • 1 offset location for *Hibbertia puberola* • 1 offset locations for *Marsdenia viridiflora* subsp. *viridiflora* • 2 offset locations for *Persoonia nutans* • 3 offset locations for *Pimelea spicata* • 2 offset locations for *Pultenaea parviflora* • 1 offset locations for *Pultenaea pedunculata* Fauna species • 3 offset locations for *Meridolum corneovirens* • 2 offset locations for *Myotis macropus;*	1. Protect offset locations for the target threatened species through reserves or biodiversity stewardship sites or through the direct purchase of species credits in the Cumberland subregion or across NSW. 2. Achieve the Plan's species targets by applying the conservation lands selection steps. 3. Identify species-specific management measures for areas of known habitat for target species, in consultation with future land managers of reserves established under the Plan and incorporate it into management plans for the land. 4. Identify specific monitoring requirements for areas of known habitat for target species, in consultation with future land managers of reserves established under the Plan, and incorporate into the monitoring, evaluation and reporting framework (Commitment 27). 5. Track progress in meeting species offset targets through the reconciliation accounting process (Commitment 27 Action 2).	Action 1,2,3,4: Life of Plan Action 5: Year 1

Commitments	Actions	Timing
Commitment 9.2 This includes protecting potential habitat for the following target threatened fauna species: • 4,470 hectares of potential foraging habitat for *Lathamus discolour* • 610 hectares of important habitat for *Phascolarctos cinereus.* **Commitment 9.3** Track and adjust offset targets using the Plan's reconciliation accounting process and report to DAWE and EES. The Plan's offset targets for threatened species may be adjusted to account for future avoidance of biodiversity values within major infrastructure corridors.		
Commitment 10 Establish a reserve to protect the north-south koala movement corridor along the Georges River between Appin and Kentlyn.	1. Protect up to 700 hectares of land between Appin and Kentlyn that is currently in ownership of NSW Government as the first stage in establishing the Georges River Koala Reserve. 2. Protect an additional 430 hectares of land between Appin and Kentlyn through the acquisition of land for the Georges River Koala Reserve. 3. Gazette the preliminary stages of the Georges River Koala Reserve as a conservation reserve under the management of National Parks and Wildlife Service. 4. Protect up to 755 hectares of land between Kentlyn and Long Point as future additions to the Georges River koala reserve. 5. Restore up to 200 hectares of cleared land within the Georges River koala reserve to strengthen the north-south koala movement corridor.	Action 1: Year 1 Action 2: Years 1-10 Action 3: Year 10 Action 4: Years 10-20 Action 5: Years 1-20

Commitments	Actions	Timing
Commitment 11 Establish at least two new reserves in addition to the Georges River Koala Reserve that will protect threatened communities, species and habitat that are targeted for protection through the Plan.	1. Investigate a new reserve that will provide an ecological connection between Gulguer Nature Reserve, Bents Basin State Conservation Area and Burragorang State Conservation Area. 2. Investigate a new reserve on Wianamatta (South Creek) that will allow for the restoration of up to 570 hectares of threatened ecological communities. 3. Undertake ground truthing and field surveys to confirm native vegetation extent and condition within the reserve investigation areas. 4. Establish a community engagement program with landholders in the reserve investigation areas to provide information and seek expressions of interest for land acquisition. 5. Establish stewardship sites on land acquired for conservation and manage according to the requirements of the biodiversity stewardship agreement. 6. Undertake ecological restoration of targeted threatened ecological communities on stewardship sites in accordance with the requirements of the stewardship agreement management plan. 7. Gazette at least two new reserves in addition to the Georges River Koala Reserve by Year 20 of the Plan.	Action 1: Year 1-3 Action 2: Year 1 Actions 3,4: Year 3 onwards Action 5: Year 20
Commitment 12 Secure priority habitat corridors in the Cumberland subregion in perpetuity, to support connectivity for ecological communities and species.	1. Undertake ground-truthing within the strategic conservation area to confirm native vegetation extent and condition in areas identified as potential habitat corridors. 2. Secure priority habitat and koala movement corridors in accordance with the Conservation Lands Implementation Strategy to protect habitat corridors in the Cumberland subregion. 3. Protect avoided koala habitat through environmental conservation zoning in potential east-west koala movement corridors between the Georges River and the Nepean River.	Action 1: Years 1-3 Action 2,3: Before start of Plan Action 4: Years 1-5 Action 5: Years 1-20 Action 6: Years 1-3

Commitments	Actions	Timing
	4. Through restoration, ensure at least one north–south corridor (the Georges River Koala Reserve) is at least 390m wide with an adequate or additional buffer, for koala viability and movement. 5. Facilitate koala movement for at least one east–west corridor by constructing a koala crossing at Appin Road and, through restoration, ensure the corridor is at least 390m wide with an adequate or additional buffer wherever feasible, for koala viability and movement 6. Construct a koala passage under Kings Fall Bridge to support north-south koala movement from the Georges River Koala Reserve to the southern koala habitat.	
Commitment 13 Undertake ecological restoration of up to 25% of the Plan's offset target for native vegetation (Commitment 8) in areas secured for conservation within the Cumberland subregion.	1. Develop a Restoration Implementation Strategy in consultation with key stakeholders and delivery partners, to: • provide a clear purpose for undertaking restoration, including how the Plan will meet its restoration target for impacted native vegetation communities • ensure the long-term sustainability of restoration considers genetic diversity in what is planted • identify restoration potential of land within priority sites • provide guidance on restoration expectations at priority sites • identify opportunities for landholders to undertake active restoration as part of a biodiversity stewardship agreement • identify and potentially fund restoration on land adjacent to conservation land established under the Plan • develop a seed-procurement approach • determine any research needs. 2. Enter into written agreements with delivery partners and engage specialist providers where necessary to implement the restoration plan. 3. Undertake up to 1,365 hectares of ecological restoration on conservation land targeting the following threatened ecological communities:	Action 1: Before start of Plan Action 2: Year 1 Action 3: Life of Plan Action 4: Year 1-5 Action 5: Year 6 onwards Action 6: Year 10 onwards

Commitments	Actions	Timing
	• Cooks River Castlereagh Ironbark Forest • Cumberland Plain Woodland • River-flat Eucalypt Forest • Shale Gravel Transition Forest • Swamp Oak Forest. 4. Plant around 100,000 trees to restore important koala habitat in • Georges River Koala Reserve • along Ousedale Creek • around Appin • other priority locations in the strategic conservation area. The restoration of important koala habitat will primarily include the restoration of Cumberland Plain Woodland and Shale/Sandstone Transition Forest. 5. In partnership with restoration providers, supply training in best-practice bush regeneration and ecological restoration techniques to landholders and community groups that is consistent with the Restoration Implementation Strategy. 6. Establish demonstration sites to showcase best-practice bush regeneration and ecological restoration of threatened ecological communities within the Plan Area.	
Commitment 14 Minimise impacts from development on biodiversity values in the strategic conservation area.	1. Implement planning controls for the strategic conservation area to require consideration of impacts on biodiversity values when consent authorities consider development applications. 2. Prepare a section 9.1 Ministerial Direction under the *Environmental Planning and Assessment Act 1979* (NSW) to require consideration of impacts on biodiversity values and the objectives of the Plan when planning authorities consider rezoning applications or review Local Environmental Plans within the strategic conservation area.	Actions 1,2: Year 1 Action 3: Year 1-5

Commitments	Actions	Timing
	3. Work with councils to integrate mapping of the strategic conservation area into local and regional planning through Local Strategic Planning Statements, which guide the local plan-making process.	
Commitment 15 Minimise impacts from adjoining land-uses on biodiversity values of conservation land.	1. Identify where buffers are required to minimise impacts on adjacent conservation land and define appropriate buffer areas and/or distances for each. 2. Introduce planning provisions to minimise the impacts of development in buffer areas on adjacent conservation land. 3. Engage with landholders in buffer areas to encourage sympathetic ongoing land management. 4. Work with councils and other landholders to install signs and interpretive displays at identified conservation land to raise awareness of the biodiversity values of a site.	Actions 1-4: Life of Plan

Managing landscape threats

Commitments	Actions	Timing
Commitment 16 Manage priority weeds in strategic locations in the Cumberland subregion to reduce threats to land secured within the strategic conservation area.	1. Establish a weed control working group to guide the implementation of weed control activities under the Plan including the preparation of a Weed Control Implementation Strategy. 2. Assess the extent and threat posed by existing weed species in the strategic conservation area. 3. Prepare a Weed Control Implementation Strategy to establish a coordinated weed control program, that: • identifies priority weed species and priority locations for weed control to maximise benefits to biodiversity in the strategic conservation area • identifies the training, extension and resource needs to address threats • provides guidance on weed control methods • identifies roles, responsibilities, delivery partners and other stakeholders, including Bushcare and Landcare groups, and Local Aboriginal Land Councils • provides guidance on funding decisions under the weed control program. 4. Enter into written agreements with delivery partners to implement the weed control program. 5. Integrate weed control actions for conservation land into biodiversity stewardship agreements and reserve management plans. 6. Provide grants to Bushcare and Landcare groups to reduce weeds on public land adjoining or near to conservation land. 7. Provide grants to Local Aboriginal Land Councils to reduce weeds on Aboriginal-owned land adjoining or near to conservation land.	Action 1: Year 1 Actions 2,3,4: Year 2 Action 5: Life of Plan Actions 6,7: Years 6-15

Commitments	Actions	Timing
Commitment 17 Manage priority pest animals in strategic locations in the Cumberland subregion to reduce threats to land protected in the strategic conservation area. **Commitment 17.1** Reduce the risk of secondary poisoning from pesticides for the following threatened raptor species: • Little Eagle • Spotted Harrier • Square-tailed Kite • White-bellied Sea-eagle	1. Establish a pest animal working group to guide the implementation of pest animal control activities under the Plan including preparation of a Pest Animal Control Implementation Strategy. 2. Assess the extent and threat posed by existing pest species to biodiversity in the strategic conservation area. 3. Prepare a Pest Animal Control Implementation Strategy to guide the implementation of the pest control program, that: • identifies pest control priorities, including priority pest species and priority locations for pest control to maximise benefits to biodiversity in the strategic conservation area • identifies the training, extension and resource needs to address threats • provides guidance on pest control methods • identifies roles, responsibilities, delivery partners and other stakeholders • provides guidance on funding arrangements under the pest control program. 4. Ensure that the Pest Animal Control Implementation Strategy specifies the use of pest control techniques that will reduce the risk of secondary poisoning from Pindone or second-generation rodenticides. 5. Enter into written agreements with delivery partners to implement the pest animal control program. 6. Integrate pest control actions for conservation lands into biodiversity stewardship agreements and reserve management plans.	Action 1: Year 1 Actions 2,3,4,5: Year 2 Action 6: Year 3 onwards
Commitment 18 Manage fire in strategic locations in the Cumberland subregion to support the maintenance of biodiversity values on conservation land.	1. Consult with the NSW Rural Fire Service, National Parks and Wildlife Service, and the department (Environment, Energy and Science Group) to identify fire management priorities, including fire sensitive species and ecological communities.	Actions 1-4: Years 1-5 Action 5: Year 5 onwards

Commitments	Actions	Timing
	2. Consult with traditional landowners to learn about Indigenous fire management techniques and consider how this knowledge may be applied to manage and protect conservation land. 3. Prepare a Fire Management Strategy for the strategic conservation area that: • identifies priority locations for fire management to maximise benefits to biodiversity in the strategic conservation area • identifies priority fire-sensitive species and ecological communities • provides guidance on fire management to maintain and promote biodiversity values, particularly among fire sensitive species and ecological communities • identifies roles and responsibilities and co-ordinates delivery partners • provides criteria to guide decisions on funding of fire management under the Plan. 4. Enter into written agreements with delivery partners to implement the fire management strategy. 5. Integrate fire management actions for conservation land identified in the fire management strategy in stewardship agreements and reserve management plans.	
Commitment 19 Support new or existing programs to control key diseases affecting threatened species and ecological communities in the Cumberland subregion.	1. Consult with researchers, government agencies and other delivery partners to identify programs that contribute to the management of disease and dieback in the Cumberland subregion including consideration of the following key threatening processes: • *Phytophthora cinnamomi* root fungus • Amphibian chytrid fungus • Psittacine circoviral beak and feather disease • Psyllid and Bell Miner associated dieback in Eucalypts. 2. Enter into written agreements with delivery partners to implement priority disease control programs.	Actions 1,2: Year 6 onwards

Commitments	Actions	Timing
Commitment 20 Support existing or new programs to help threatened species and ecological communities adapt to the impacts of climate change in the Plan Area.	1. Provide funding for research on climate adaptation for biodiversity to identify: • most at-risk species and ecological communities in the Cumberland subregion • priority locations in the subregion, such as climate refugia, to support persistence and adaptation of at-risk species and ecological communities to climate impacts. • species resilience and genetic diversity to inform seed strategy and seedling supply. 2. Amend the strategic conservation area if new priority locations are identified through research that will support biodiversity adaptation to climate impacts and incorporate these new areas into the Conservation Lands Implementation Strategy (Commitment 8). 3. Provide advice and support to councils to integrate the results of research including identification of any important climate refugia into council's reserve management programs.	Action 1: Year 2-10 Action 2,3: Life of Plan

Building knowledge and capacity

Commitments	Actions	Timing
Commitment 21 Provide opportunities for the residents of Western Sydney to learn about and actively participate in biodiversity conservation including koala conservation.	1. Host a biodiversity education and engagement symposium with key delivery partners during Year 4 of the Plan to prioritise education and engagement needs. 2. Prepare an Education and Engagement Implementation Strategy to guide implementation of the education and engagement program, that: • identifies priority topics for education • identifies intended audiences • proposes implementation mechanisms • outlines governance arrangements for implementing the program • proposes funding arrangements. 3. Establish at least three full time biodiversity education officers across priority Local Government Areas to provide ongoing community education and engagement activities that are consistent with the implementation strategy. 4. Establish two part-time Aboriginal education officers to provide ongoing biodiversity, cultural awareness and engagement activities to schools and communities consistent with the implementation strategy. They would also provide advice on integrating local Aboriginal culture into local government programs. 5. Enter into written agreements with councils and other delivery partners to implement the education and engagement program. 6. Establish an education and engagement program that is consistent with the implementation strategy, with indicative activities that include: • engaging with local schools to provide biodiversity education • hosting community activities such as tree planting and nature walks • developing a mobile education trailer as a shared resource for Councils in the Plan area	Action 1,2: Year 4 Actions 3,4,5: Year 5 Actions 6,7,8: Year 6 onwards

Commitments	Actions	Timing
	• promoting new and existing citizen science programs to encourage participation in nature-related science • raising awareness of the cultural significance of biodiversity to Aboriginal people. 7. Invest in the *NSW Koala Strategy* to raise awareness of the Southern Sydney koala population and encourage community participation in koala conservation in Western Sydney, consistent with the Plan's education and engagement program. 8. Review education and engagement needs with delivery partners in a one-day workshop to highlight successes and review priorities every two years.	
Commitment 22 Partner with Aboriginal communities in Western Sydney to provide opportunities to participate in biodiversity conservation and related economic opportunities arising from the Plan.	1. Partner with Aboriginal Land Councils and the Aboriginal community in Western Sydney to co-design the 10-year Aboriginal Engagement and Implementation Strategy. Indicative actions in the strategy may include: • establishing a partnership with NSW Aboriginal Land Council, and Western Sydney's Aboriginal community and Local Aboriginal Land Councils to support delivery of the Plan • funding the upfront costs of biodiversity assessment to encourage and support the establishment of stewardship sites on Aboriginal-owned land • ensuring that at least 5% of expenditure for services needed for implementation of the Plan are awarded to Aboriginal-owned businesses • building capacity in Aboriginal businesses and organisations by providing training and start-up funding for businesses that contribute to achieving the conservation outcomes of the Plan • working with the Department of Crown Lands to support the speedy resolution of Aboriginal land claims under the *Aboriginal Land Rights Act 1983* for areas within potential conservation lands	Action 1: Year 1 Action 2: Years 2-11

Commitments	Actions	Timing
	• working with the National Parks and Wildlife Service (NPWS) and Local Aboriginal Land Councils to investigate opportunities for joint management of new conservation reserves by the Aboriginal community within the Plan Area • supporting cultural activities on conservation lands such as a scheme to acknowledge and celebrate cultural values on conservation lands. 2. Implement a 10-year Aboriginal Engagement and Implementation Strategy to undertake targeted and ongoing engagement with Western Sydney's Aboriginal community to support and deliver economic opportunities arising from the Plan's implementation.	
Commitment 23 Provide for extension services to community groups, councils, Local Aboriginal Land Councils, and landholders to support biodiversity conservation on public and private land.	1. In partnership with the Biodiversity Conservation Trust tailor information packages to promote stewardship options and biodiversity management on private land within the strategic conservation area. 2. In partnership with Local Land Services, councils, Local Aboriginal Land Councils and other delivery partners provide community workshops on managing weeds and pest animals, consistent with the weed and pest animal implementation strategies (Commitment 16, Commitment 17).	Action 1: Years 1-5 Action 2: Year 6 onwards
Commitment 24 Invest in research that will help to secure threatened species and increase understanding of threats and land management issues.	1. Host a research symposium with key agencies, research partners, and delivery partners during Year 1 of the Plan to prioritise research needs. 2. Prepare a Research Program Implementation Strategy that will help achieve biodiversity and restoration outcomes in Western Sydney, including: • identifying key research priorities • identifying major research programs and partners • assessing the need for a small-scale competitive grant program • governance arrangements for implementing the research program • timeframes for implementing the major research programs • decision-making criteria for funding research programs under the Plan. 3. Enter into written agreements with delivery partners to implement the research program.	Actions 1,2: Year 1 Actions 3,4: Year 2 onwards

Commitments	Actions	Timing
	4. Implement the research program with key outcomes including: • establishing a five-year research program on threatened species in the Cumberland subregion through the Saving our Species program • research on the adaptive potential of threatened species and ecological communities to climate change • research that increases knowledge of genetic diversity and techniques for restoring threatened ecological communities • research that increases knowledge of population demographics, life-history and ecology of the Southern Sydney koala population, as part of the *NSW Koala Strategy Research Plan* • research into the connections between biodiversity and Aboriginal culture and practices in Western Sydney.	
Commitment 25 Support rehabilitation measures to help maintain koala health and welfare.	1. Invest in the *NSW Koala Strategy* and other potential partners to implement the koala health and welfare program in South Western Sydney with key deliverables including: • monitoring of koalas including key threats and effectiveness of mitigation measures as part of the *NSW Koala Strategy Monitoring Framework* • providing enhanced training in wildlife treatment for veterinarians • providing grants for community wildlife organisations for resources and carer recruitment and training • establishing health and welfare programs to support koalas from threats including vehicle strike, fire, disease and climate change.	Action 1: Year 1 onwards

Governance and reporting

Commitments	Actions	Timing
Commitment 26 Establish governance arrangements including roles, responsibilities and funding to ensure the efficient and effective implementation of the Plan.	1. Establish a multi-agency executive implementation committee to act as a central governance steering committee for the Plan. 2. Enter into written agreements with delivery partners to support the implementation of specific commitments and actions. 3. Establish working groups to advise the executive implementation committee and oversee implementation of specific commitments and actions (commitments 7, 16, 17 and 28). 4. Establish arrangements to recover costs from developers in the nominated areas through a biodiversity component of the Special Infrastructure Contribution that is earmarked to deliver the Plan's commitments and actions. 5. Establish a Trust to administer funds to implement the Plan on behalf of the department. 6. Establish arrangements in consultation with the Trust to clarify funding arrangements including how funding decisions will be made, administered and reported. 7. Investigate the application of a Special Infrastructure Contribution charge for commercial and industrial development in nominated areas to deliver the Plan's commitments and actions. 8. Ensure that 90% of conservation program funding is spent on establishing and restoring conservation lands.	Actions 1-7: Year 1 Action 8: Life of Plan
Commitment 27 Implement an evaluation program for the Plan that sets out requirements for monitoring, evaluation, reporting and adaptive management.	1. Finalise the evaluation program in consultation with key stakeholders, including: • establish governance arrangements for the evaluation program as part of the Plan's governance arrangements for implementation • monitoring and data collection methodology • evaluation questions including scope and frequency • method for evaluation outputs to support adaptive management • the reconciliation accounting process to track progress of the Plan's commitments and actions	Actions 1,2: Year 1 Action 3: Year 5 onwards

Commitments	Actions	Timing
	• templates for reporting quarterly to the executive implementation steering committee and annual updates over the life of the Plan. • establishing processes to support independent five-yearly reviews of the Plan 2. Track progress of meeting conservation targets in hectares through the reconciliation accounting process 3. Implement adaptive management steps for offsets if the reconciliation accounting process determines that the Plan's offsets are not keeping track with development. 4. Publish yearly updates over the life of the Plan. 5. Undertake independent five-yearly reviews of the progress of the Plan, including progress towards meeting commitments and achieving outcomes, and a publicly accessible review report.	
Commitment 28 Implement a compliance program to ensure compliance with the Plan and conditions of approval,	1. Establish a compliance working group comprising the department, councils and other relevant stakeholders to guide the implementation of compliance activities under the Plan including preparation of a Compliance Strategy. 2. Prepare a Compliance Strategy under guidance of the working group to: • identify relevant compliance mechanisms • set out compliance monitoring and auditing priorities and processes • set out a decision-making framework for taking compliance action • set out procedures and protocols for taking compliance action • identify roles and responsibilities for compliance. 3. Provide funding to employ at least three full-time compliance officers to carry out compliance activities in the Plan area.	Actions 1,2: Year 1 Action 3: Year 2 onwards

Appendix B. Avoidance criteria

Avoidance of biodiversity values

The Department of Planning, Industry and Environment (the department) and Transport for NSW have undertaken strategic planning to locate and design the urban capable land for nominated areas and infrastructure corridors. This process aims to avoid and minimise impacts on biodiversity values, and has been undertaken consistent with:

- section 8 of the Biodiversity Assessment Method (BAM)
- the draft guidelines for planning authorities (Environment Energy and Science, 2019)
- the strategic assessment Terms of Reference (ToR).

Avoiding and minimising impacts on biodiversity values is an important part of the planning and assessment process. It is a critical step in limiting the effects of the proposed development and reducing the need for the conservation program to offset those impacts. It also provides opportunities to protect important areas of remaining biodiversity, by applying the conservation program's commitments and actions – such as biodiversity stewardship agreements – on avoided lands.

It is also fundamental to demonstrating that the commitments and actions proposed for strategic biodiversity certification adequately address the impacts of the proposed development under section 8.7 of the *Biodiversity Conservation Act 2016* (NSW) (see Part 7). Documenting the process is a requirement of the ToR for the strategic assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Definition of avoidance

There may be several reasons why land is avoided and not impacted during strategic planning, including because it:

- has biodiversity value
- is not suitable for development (for example, if it is existing protected land, steep land or a riparian buffer).

Under the BAM, avoidance refers to land that is suitable for development and included in the biodiversity certification process but has been avoided because of its biodiversity value. Land not impacted because it is not suitable for development is not considered to have been avoided under the BAM.

In accordance with the BAM, the Cumberland Plain Assessment Report determines avoidance outcomes for specific biodiversity values on the basis of the amount of land avoided because of its biodiversity value. However, it also mentions the amount of land avoided for other purposes – such as land that is not suitable for urban development – to provide additional context.

For the purposes of the Cumberland Plain Assessment Report, land is considered to be unsuitable for urban development if it is:

- a riparian buffer, consistent with the *Water Management Act 2000* (NSW)
- State-protected land with a slope of more than 18 degrees
- existing protected land, including reserves and offset sites
- Commonwealth land, such as the Defence Establishment Orchard Hills

- land zoned for public recreation (Zone RE 1 under the standard instrument prescribed by the Standard Instrument (Local Environmental Plans) Order 2006).

Flood-prone land is not included in the list of land not suitable for urban development because significant development does occur within flood-prone land in the study area. The use of fill and other flood-mitigation works means that flood-prone land does not necessarily constrain urban development.

For the purposes of the Cumberland Plain Conservation Plan, land avoided from development and not subject to biodiversity certification (the 'avoided land') has been categorised into the following:

- avoided for biodiversity purposes – land that has high biodiversity values to be protected and has been avoided from the certified-urban capable land for this reason
- avoided for other purposes – land that cannot be feasibly developed due to the topography (slope) of the land or having an environmental feature such as a riparian corridor

The remaining three criteria listed above, as land considered unsuitable for development, have been excluded from the Plan and Plan approvals.

Development of avoidance criteria

Criteria were developed to help identify priorities for avoiding biodiversity values (see Text Box 1). These criteria provided detailed guidance, consistent with guidance provided in the BAM, to inform decisions about the location and design of the urban capable land. These decisions were made in a series of workshops attended by the department's precinct planners and ecologists. Applying the avoidance criteria identified land within the nominated areas to be avoided for biodiversity purposes.

The avoidance criteria identified priorities for avoidance within three main categories:

- TECs and plant community types (PCTs)
- threatened species
- ecological processes.

Applying the avoidance criteria results in avoided land that includes non-vegetated areas such as small wetlands and waterbodies, land that is strategically important to protect or enhance corridors, or small enclosed clearings that are surrounded by native vegetation.

Box 1: Avoidance criteria and categories

Box 1. Avoidance criteria

(a) TECs and PCTs

1. Critically endangered ecological communities (CEECs) or PCTs ≥90% cleared in large patches and in good condition; or serious and irreversible impact (SAII) entities (TECs)

2. EECs or PCTs ≥70% to <90% cleared in large patches and in good condition

3. PCTs ≥50% to <70% cleared in large patches and in good condition

4. PCTs <50% cleared in large patches and in good condition

(b) Threatened species

1. Known habitat^ for critically endangered species, SAII entities (species), Saving Our Species (SOS) species polygons (where species-specific habitat is present), or large populations of threatened species (relative to typical size for that species); or known primary koala habitat

2. Known habitat^ for endangered species or known secondary koala habitat

3. Known habitat^ for vulnerable species

(c) Ecological processes

1. Land identified as priority conservation lands, BIO Map core areas, or important local habitat corridors for key species including koalas

2. Land identified as BIO Map regional corridors or as areas that provide significant opportunities to support important local habitat corridors for key species, including koalas

3. Areas identified on the Biodiversity Values Map

Boundary rationalisation

Consider removing:

• small nodes or isolated patches of features identified in (a), (b) or (c) if future land use change will lead to significant edge effects and low viability over the timeframe identified, and there is no feasible opportunity to enhance connectivity and extent

• corridors that do not link important areas of habitat, including 'blind corridors'.

^ As indicated by NSW BioNet records or recent survey data

Calculating avoidance outcomes

The following method is used to calculate avoidance outcomes for specific biodiversity values – for example, a threatened ecological community (TEC), – within the nominated areas:

- Step 1: Determine the total existing area of each biodiversity value, in hectares.
- Step 2: Determine the total area impacted by urban development for each biodiversity value.
- Step 3: Determine the total area impacted by transport for each biodiversity value.
- Step 4: Determine the area of each biodiversity value within land unsuitable for urban development.
- Step 5: Determine the area avoided because of its biodiversity value, by subtracting the sum of the amounts from steps 2, 3 and 4 from the amount in Step 1.

The urban capable land boundary can only be updated as a result of consultation if:

- creeks and water features are mapped incorrectly, in which case they must be updated to match the topography and vegetation indicating movement of water through the landscape
- on-site data collected by accredited assessors supports updating the boundaries
- there is no net change to impact of threatened ecological communities, SAII entities or vegetation in an intact condition state
- there is no impact on an identified landscape corridor
- authorised clearing has occurred. (The relevant Council will review cleared areas and determine if the clearing was permitted. The urban capable land boundary will not be changed if the clearing was unauthorised.)

Appendix C. Biodiversity values to be offset through the conservation program

EPBC Act and BC Act matters

Vegetation communities and threatened ecological communities

PCT number	PCT name	TEC name (BC Act)	NSW status	Impact (ha)	TEC name (EPBC Act)	EPBC status	Impact (ha)
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	52.2	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically endangered	154.7
849	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	Cumberland Plain Woodland	Critically endangered	729.8	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically endangered	Included in above (154.7)
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Cumberland Plain Woodland	Critically endangered	284.8	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically endangered	Included in above (154.7)
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	36.9	Cooks River/Castlereagh Ironbark Forest	Critically endangered	26.3

PCT number	PCT name	TEC name (BC Act)	NSW status	Impact (ha)	TEC name (EPBC Act)	EPBC status	Impact (ha)
781	Coastal freshwater lagoons of the Sydney Basin Bioregion and South East Corner Bioregion	Freshwater Wetlands	Endangered	2.1	Freshwater Wetlands	n/a	0.0
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	River-flat Eucalypt Forest	Endangered	165.1	Coastal floodplain eucalypt forest of eastern Australia[14]	Nominated for listing as endangered	210.2
830	Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Moist Shale Woodlands	Endangered	0.1	Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically endangered	0.0
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	487.7	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Critically endangered	191.8
1800	Swamp Oak open forest on river flats of the Cumberland Plain and Hunter valley	Swamp Oak Forest	Endangered	19.2	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	1.8
TOTAL				**1777.8**			**584.8**

[14] The “River-flat eucalypt forest on coastal floodplains of New South Wales” was nominated for listing as a threatened ecological community under the EPBC Act in 2016. It has since been renamed as *Coastal floodplain eucalypt forest of eastern Australia*. The proposed conservation status for this ecological community is ‘endangered’.

Threatened species

Scientific name	Common name	Credit class	Type	EPBC status	BC Status
Acacia bynoeana	Bynoe's Wattle, Tiny Wattle	Species	Flora	Vulnerable	Endangered
Acacia pubescens	Downy Wattle, Hairy Stemmed Wattle	Species	Flora	Vulnerable	Vulnerable
Allocasuarina glareicola		Species	Flora	Endangered	Endangered
Anthochaera phrygia	Regent Honeyeater	Species/Ecosystem	Bird	Critically Endangered	Critically Endangered
Botaurus poiciloptilus	Australasian Bittern	Ecosystem	Bird	Endangered	Endangered
Callocephalon fimbriatum	Gang-gang Cockatoo	Species/Ecosystem	Bird	NA	Vulnerable
Calyptorhynchus lathami	Glossy Black-Cockatoo	Species/Ecosystem	Bird	NA	Vulnerable
Cercartetus nanus	Eastern Pygmy-possum	Species	Mammal	NA	Vulnerable
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	Species	Mammal	Vulnerable	Vulnerable
Cynanchum elegans	White-flowered Wax Plant	Species	Flora	Endangered	Endangered
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (south-eastern mainland population)	Ecosystem	Mammal	Endangered	Vulnerable
Dillwynia tenuifolia		Species	Flora	NA	Vulnerable
Epacris purpurascens var. purpurascens		Species	Flora	NA	Vulnerable
Eucalyptus benthamii	Camden White Gum, Nepean River Gum	Species	Flora	Vulnerable	Vulnerable
Grevillea juniperina subsp. Juniperina	Juniper-leaved Grevillea	Species	Flora	NA	Vulnerable
Grevillea parviflora subsp. Parviflora	Small-flower Grevillea	Species	Flora	Vulnerable	Vulnerable
Haliaeetus leucogaster	White-bellied Sea-Eagle	Species/Ecosystem	Bird	NA	Vulnerable
Heleioporus australiacus	Giant Burrowing Frog	Species	Amphibian	Vulnerable	Vulnerable

Hibbertia fumana		Species	Flora	NA	Critically Endangered
Hibbertia puberula		Species	Flora	NA	Endangered
Hieraaetus morphnoides	Little Eagle	Species/Ecosystem	Bird	NA	Vulnerable
Lathamus discolor	Swift Parrot	Species/Ecosystem	Bird	Critically Endangered	Endangered
Litoria aurea	Green and Golden Bell Frog	Species	Amphibian	Vulnerable	Endangered
Lophoictinia isura	Square-tailed Kite	Species/Ecosystem	Bird	NA	Vulnerable
Marsdenia viridiflora subsp. viridiflora - endangered population		Species	Flora	NA	Endangered
Maundia triglochinoides		Species	Flora	NA	Vulnerable
Melaleuca deanei	Deane's Melaleuca	Species	Flora	Vulnerable	Vulnerable
Meridolum corneovirens	Cumberland Plain Land Snail	Species	Invertebrate	NA	Endangered
Micromyrtus minutiflora		Species	Flora	Vulnerable	Endangered
Myotis macropus	Southern Myotis	Species	Mammal	NA	Vulnerable
Ninox strenua	Powerful Owl	Species/Ecosystem	Bird	NA	Vulnerable
Persicaria elatior	Tall Knotweed	Species	Flora	NA	Vulnerable
Persoonia bargoensis	Bargo Geebung	Species	Flora	Vulnerable	Endangered
Persoonia hirsuta	Hairy Geebung, Hairy Persoonia	Species	Flora	Endangered	Endangered
Persoonia nutans	Nodding Geebung	Species	Flora	Endangered	Endangered
Petauroides volans	Greater Glider	Species	Mammal	Vulnerable	Not listed
Petaurus norfolcensis	Squirrel Glider	Species	Mammal	NA	Vulnerable
Phascolarctos cinereus	Koala	Species/Ecosystem	Mammal	Vulnerable	Vulnerable
Pimelea curviflora var. curviflora		Species	Flora	Vulnerable	Vulnerable

Pimelea spicata	Spiked Rice-flower	Species	Flora	Endangered	Endangered
Pomaderris brunnea	Rufous Pomaderris	Species	Flora	Vulnerable	Endangered
Pommerhelix duralensis	Dural Land Snail	Species	Invertebrate	Endangered	Endangered
Pseudophryne australis	Red-crowned Toadlet	Species	Amphibian	NA	Vulnerable
Pteropus poliocephalus	Grey-headed Flying-fox	Species/ Ecosystem	Mammal	Vulnerable	Vulnerable
Pterostylis saxicola	Sydney Plains Greenhood	Species	Flora	Endangered	Endangered
Pultenaea parviflora		Species	Flora	Vulnerable	Endangered
Pultenaea pedunculata	Matted Bush-pea	Species	Flora	NA	Endangered
Rostratula australis	Australian Painted Snipe	Ecosystem	Bird	Endangered	Endangered
Tyto novaehollandiae	Masked Owl	Species/ Ecosystem	Bird	NA	Vulnerable

Appendix D. Conservation Priorities Method

Context

The Conservation Priorities Method (the Method) is a systematic and repeatable method for determining and prioritising conservation lands for the Cumberland Plain Conservation Plan (the Plan). It combines detailed spatial information about biodiversity values with an analysis of constraints and opportunities. This assists with identifying an optimal mix of potential conservation lands to offset future impacts from development to biodiversity in Western Sydney.

The Method is a modelling approach based on numerous datasets. The Department of Planning, Industry and Environment (the Department) is refining outputs from the Method through consultations with other agencies and the public, ground-truthing and the development of detailed implementation and evaluation arrangements.

Alignment with Plan drivers

Draft guidelines for planning authorities

The draft guidelines for planning authorities (Environment, Energy and Science Group, 2019) form part of the Method.

It provides a set of guiding principles for demonstrating that the conservation measures proposed in an application for strategic biodiversity certification adequately address impacts on biodiversity values under section 8.7 of the BC Act.

- Principle 1: Potential serious and irreversible impacts on biodiversity values are avoided and minimised.
- Principle 2: The proposed conservation measures address the biodiversity values being impacted.
- Principle 3: Conservation measures prioritise preservation of important conservation values.
- Principle 4: Conservation measures improve biodiversity values and landscape function in the long term.
- Principle 5: Conservation measures are additional to existing conservation requirements.
- Principle 6: Development controls proposed as conservation measures conserve or enhance the natural environment.
- Principle 7: Any proposed new National Parks are consistent with the comprehensive, adequate and representative (CAR) reserve system scientific framework (after Commonwealth of Australia 2010).
- Principle 8: The implementation of conservation measures is timely and certain.

The Method has been designed so that at each stage, planning authorities make the principles a key consideration when addressing biodiversity impacts on a landscape scale.

It ensures that the proposed conservation lands address the biodiversity values being impacted while maintaining and enhancing prioritised areas of important conservation values across Western Sydney. As a result, conservation lands will protect and improve biodiversity values on a landscape scale, and secure and enhance connectivity and ecosystem function in Western Sydney.

Offsetting in accordance with legislative requirements

The *Biodiversity Conservation Act 2016* (NSW) (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) have offset requirements to ensure biodiversity values are protected across the landscape. However, offset rules do not apply to biodiversity certification conferred as a result of a strategic application. Regardless, the Department relies on the rules to guide the Plan's offsetting package and they are integrated into the Method.

BC Act and Biodiversity Conservation Regulations

The following summarises the offsetting requirements to comply with the BC Act and the Biodiversity Conservation Regulation 2017:

Impacted threatened ecological communities (TECs) can be offset with matching TECs (like-for-like rule) and specific alternate plant community types (PCTs) in the same TEC (like for like rule) in the Cumberland subregion, other adjacent subregions or within any subregion within 100km of the outer edge of the impacted site.

An impacted species credit species (SCS) can be offset in any NSW subregion as long as it is in a recognised habitat (PCTs associated with that species in the NSW Bionet Threatened Biodiversity Data Collection). Additionally, there must be recent recorded sightings of that species (like-for-like rule) at the intended site. It can also be offset against another species (in the same kingdom) of same or higher listing status within the Cumberland subregion, adjacent subregions or any subregion within 100km of the outer edge of the impacted site (variations rule).

A limited range of conservation measures are approved as suitable offsets: biodiversity stewardship agreement sites (BSAs), reservations under the *National Parks and Wildlife Act 1974* (NSW) (NP&W Act) and Special Infrastructure Contributions. (Note: the Minister may determine that other measures are acceptable.)

The Biodiversity Conservation Trust (BCT) may fund biodiversity conservation actions in accordance with the offset rules, and/or retire biodiversity credits in accordance with provisions other than those under the variation rules.

Ecological restoration (an additional non-obligatory activity) must occur within biodiversity stewardship agreements sites and reserves to generate potential credits. This is due to the in-perpetuity nature of offsets required for developments (credits can only be generated if restoration occurs in an area that has a permanent covenant), unless the Minister approves specific conservation measures.

EPBC Act and Environment Protection and Biodiversity Conservation Regulations

The following summarises the offsetting requirements to comply with the EPBC Act and the Environment Protection and Biodiversity Conservation Regulations:

- Two matters of national environmental significance (MNES) have been considered in the application of the conservation priorities method for land-based offsets: listed threatened species and ecological communities, and migratory species.
- Offset requirements must follow all 10 principles of the EPBC Act environmental offsets policy.

- Three types of conservation measures: direct offsets (90% of the package), compensatory measures and advanced offsets.
- State or territory offsets will count toward an offset under the EPBC Act to the extent that it compensates for the residual impact on the protected matter identified under the EPBC Act.

Note: The EPBC Act's environmental offsets policy applies to project-by-project assessments and approvals under Parts 8 and 9 of the EPBC Act, and to strategic assessments under Part 10 of the EPBC Act. Strategic assessments may consider metrics other than those in the *Offset assessment guide* (for example, a jurisdiction may have developed a metric tailored to its needs), provided they meet the principles of this policy.

The overarching principles of the EPBC Act environmental offsets policy have been used to guide the Plan's offset package. Suitable offsets must:

- deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action
- be built around direct offsets but may include other compensatory measures
- be in proportion to the level of statutory protection that applies to the protected matter
- be of a size and scale proportionate to the residual impacts on the protected matter
- effectively account for and manage the risks of the offset not succeeding
- be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action)
- be efficient, effective, timely, transparent, scientifically robust and reasonable
- have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

In assessing the suitability of an offset, government decision-making will be:

- informed by scientifically robust information and incorporate the precautionary principle in the absence of scientific certainty
- conducted in a consistent and transparent manner.

Conservation Priorities Method – Stages

This Method applies a series of geographic information system (GIS)-based models to assess the Plan Area and identifies conservation priorities, generating several outputs. The models use multi-criteria analysis (MCA) techniques and ground-truthing processes to rank conservation priorities. The Method has four stages.

Stage 1 – Ecological assessment model

This stage identifies the areas of highest biodiversity value within the Plan Area by conducting or using:

a. an ecological assessment
b. a Phase 0 constraints assessment
c. the impact assessment results and an offset target method

d. a fusion analysis.

Stage 2 – Constraints assessment model

This stage identifies the level of constraints (from low to high) of the land for implementing potential conservation lands. This is known as a Phase 1 constraints assessment.

Stage 3 – Conservation priorities assessment and offset selection method

This stage identifies areas suitable for offsets. It includes:

a. offsetting for the Plan
b. a selection approach for potential offset areas
c. the model output
d. identifying potential offset areas outside the Plan Area.

Stage 4 – Ground-truthing program

The ground-truthing program includes:

a. a desktop assessment and aerial verification, and refinement of the offset units
b. an 'Over-the-fence' on-ground rapid assessment and refinement of offset units
c. the development of implementation proposals for each offset unit.

The Method ensures that proposed conservation lands will maintain and enhance prioritised areas for preservation of the most important conservation values (Principle 3 of the draft guidelines for planning authorities).

Note: data used throughout the process will be updated and all models re-run every five years over the life of the Plan to identify changes in constraints and new opportunities for offsetting. Collaboration with various partners (such as local councils and government departments) will assist with keeping the data up to date and identifying potential data gaps, including additional sites that may be suitable for conservation but were not identified through the Model.

Stage 1 – Ecological assessment model

Ecological assessment

Core vegetation model

The ecological assessment aims to identify remaining native vegetation in the Plan Area (and surrounding areas, including the Cumberland subregion) and rank it according to specific criteria. Consistent with Principle 1 of the draft guidelines for planning authorities, the remaining native vegetation will include areas of vegetation and threatened species habitat that could have experienced potential serious and irreversible impacts, but these were avoided or minimised through strategic planning.

The core vegetation model identifies all remaining vegetation. It has two main data layers: the core vegetated habitat layer and the vegetation condition layer.

Each category in the model was allocated a predetermined score. The combination of inputs for the two layers – the core vegetated habitat and the vegetation condition – are used to calculate scores.

The potential maximum score of 170 comprises vegetation with a patch size greater than 100 ha and a Biodiversity Assessment Method (BAM) rating tier (for critically endangered ecological communities (CEECs)) of good condition. The minimum score of 75.5 points comprises vegetation

with a patch size of less than 5 ha and a BAM rating tier for PCTs of less than 50% cleared and in poor condition.

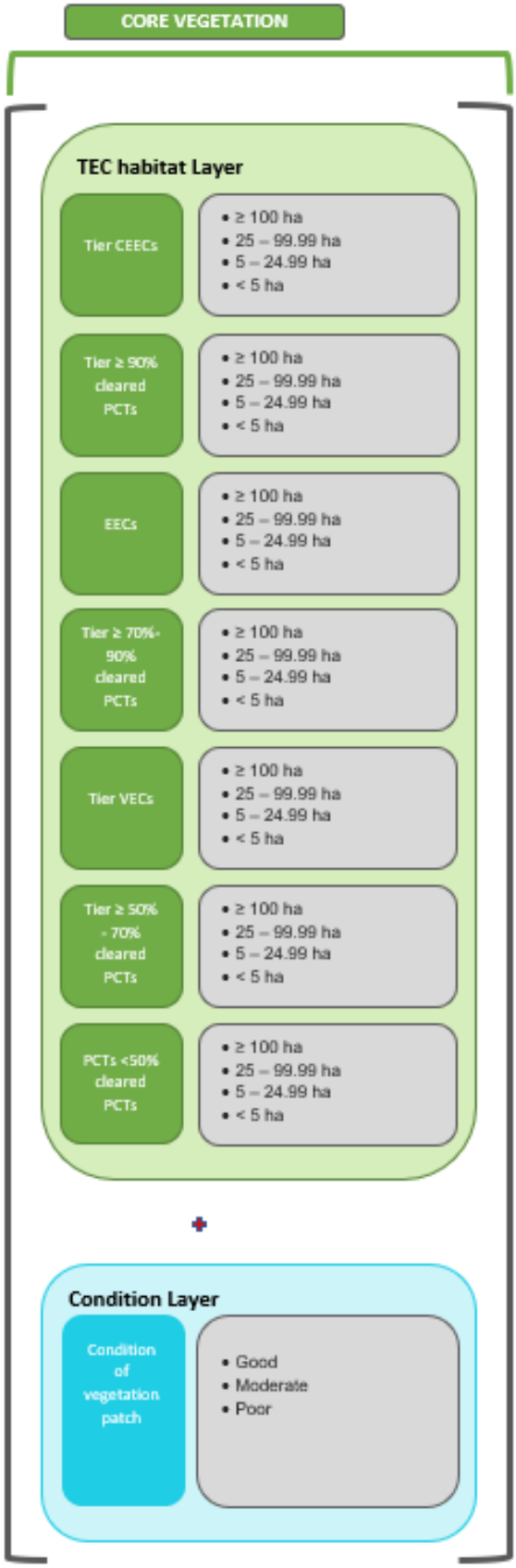


Figure 1: Core vegetation model

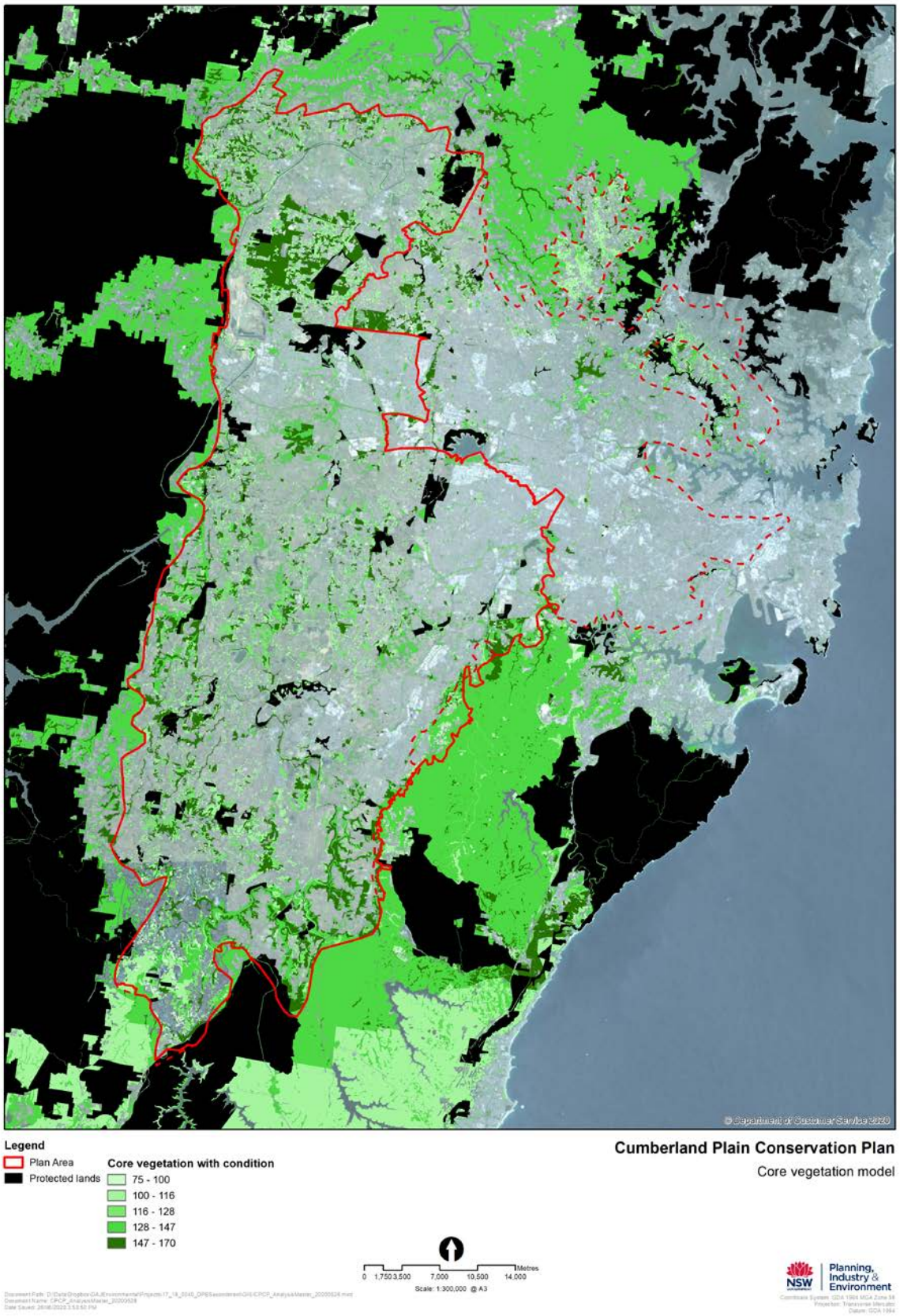


Figure 2: Core vegetation model spatial output

Feature indicators models

The core vegetation output is complemented by a number of feature indicator models. These models (shown below) add additional information and context to the ecological assessment by:

- modelling the proximity of the existing core vegetation to existing 'protected' land – the closer the feature to existing protected land, the greater the score
- modelling the potential PCTs expected to regenerate on cleared land
- modelling the presence of features within the core vegetation, such as species habitat.

These layers are used to help set conservation priority areas while working with the offset selection method.

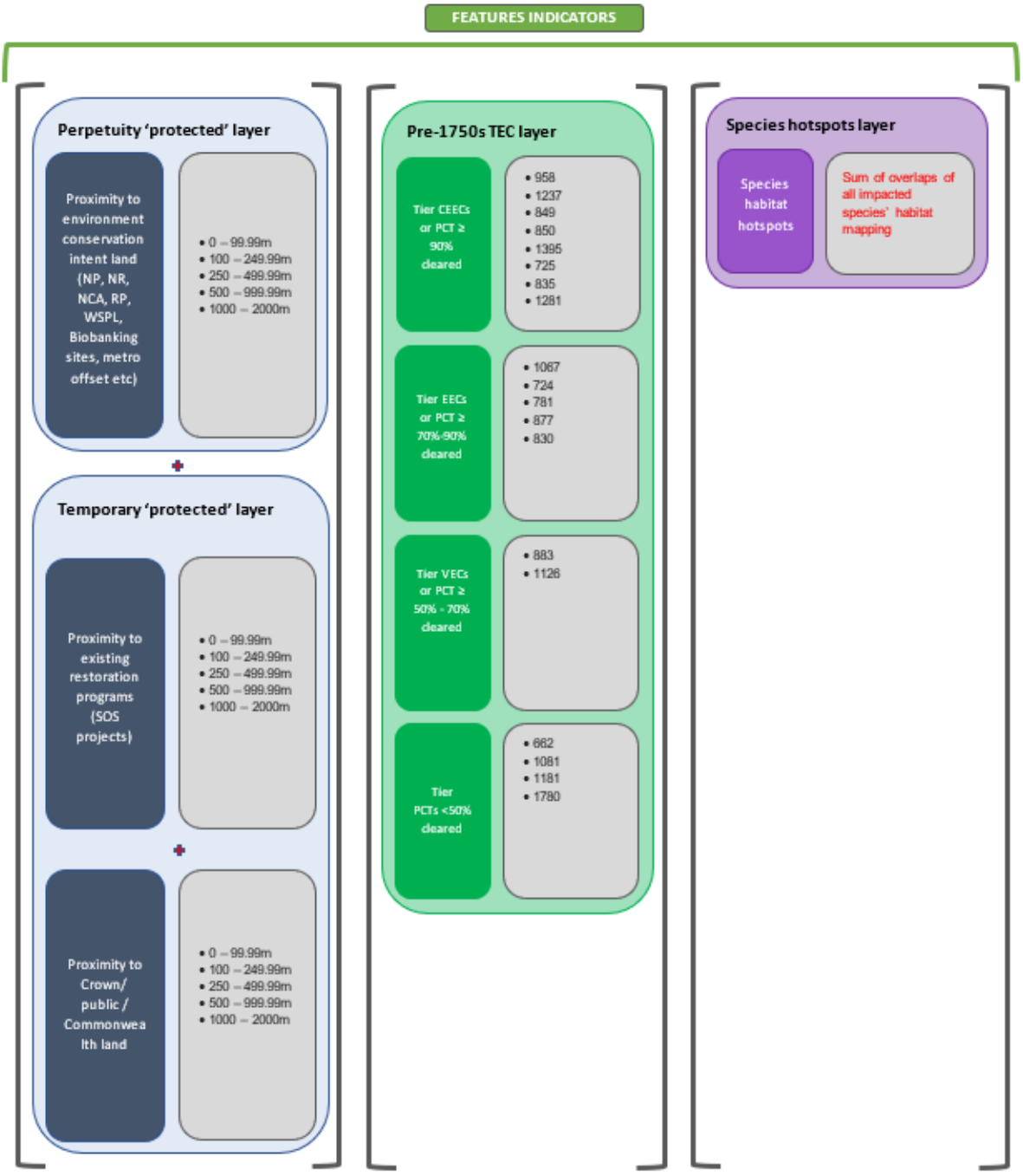


Figure 3: Feature indicators model

Phase 0 constraints assessment

Phase 0 is an exclusion model that identifies constrained land that would be unlikely to support offsets, either due to the site already being protected or because the current (or proposed) land use is not consistent with a biodiversity offset outcome. On land identified as Phase 0, the level of constraint is considered too high to implement any conservation measures at the time.

The Phase 0 filter is applied to the results of the ecological assessment's core vegetation output. The resulting layer indicates how much land identified in the core vegetation model remains potentially available for offset. It is anticipated that this Phase 0 layer will be updated from time to time as constraints change in the landscape.

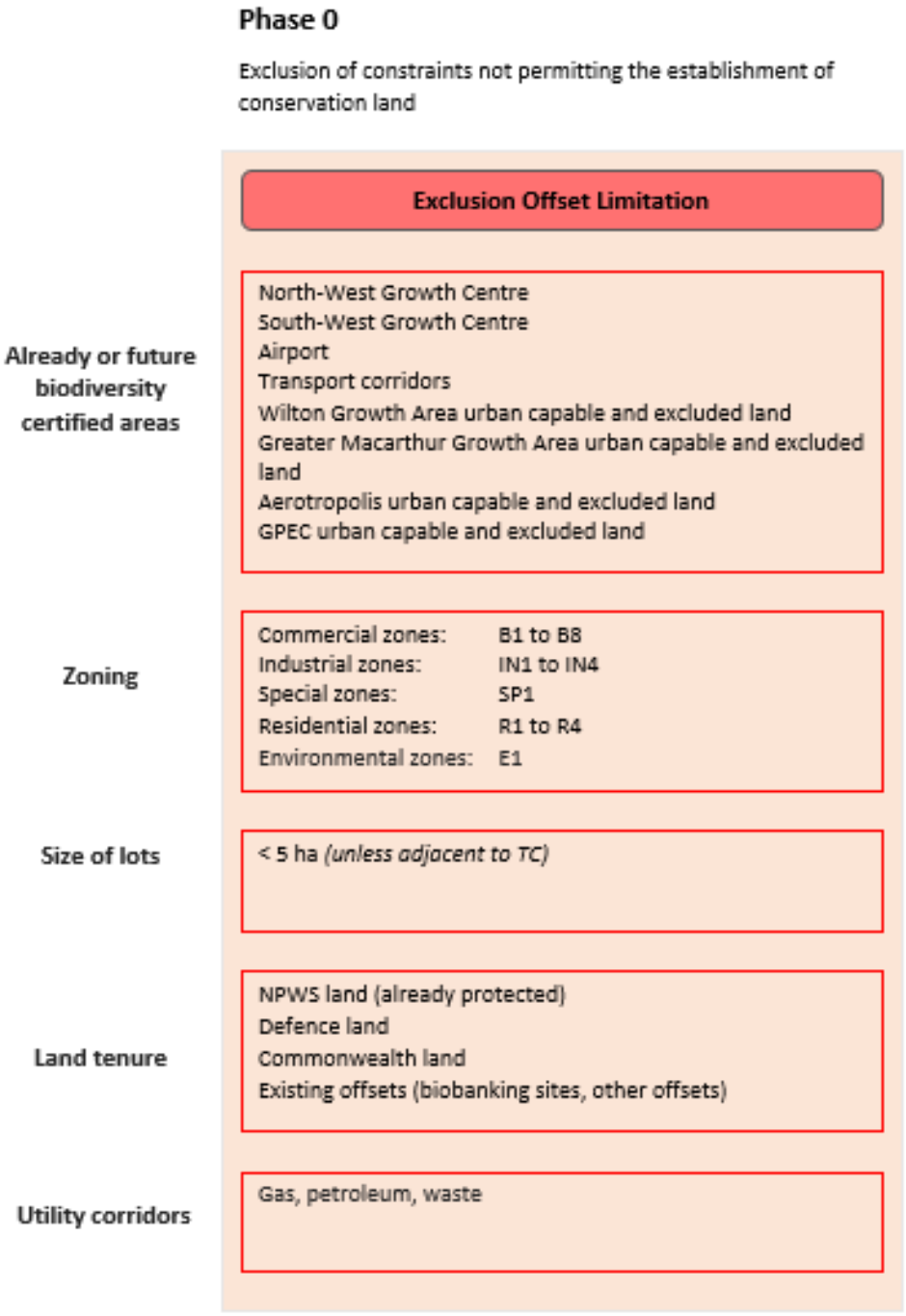


Figure 4: Phase 0 Constraints model

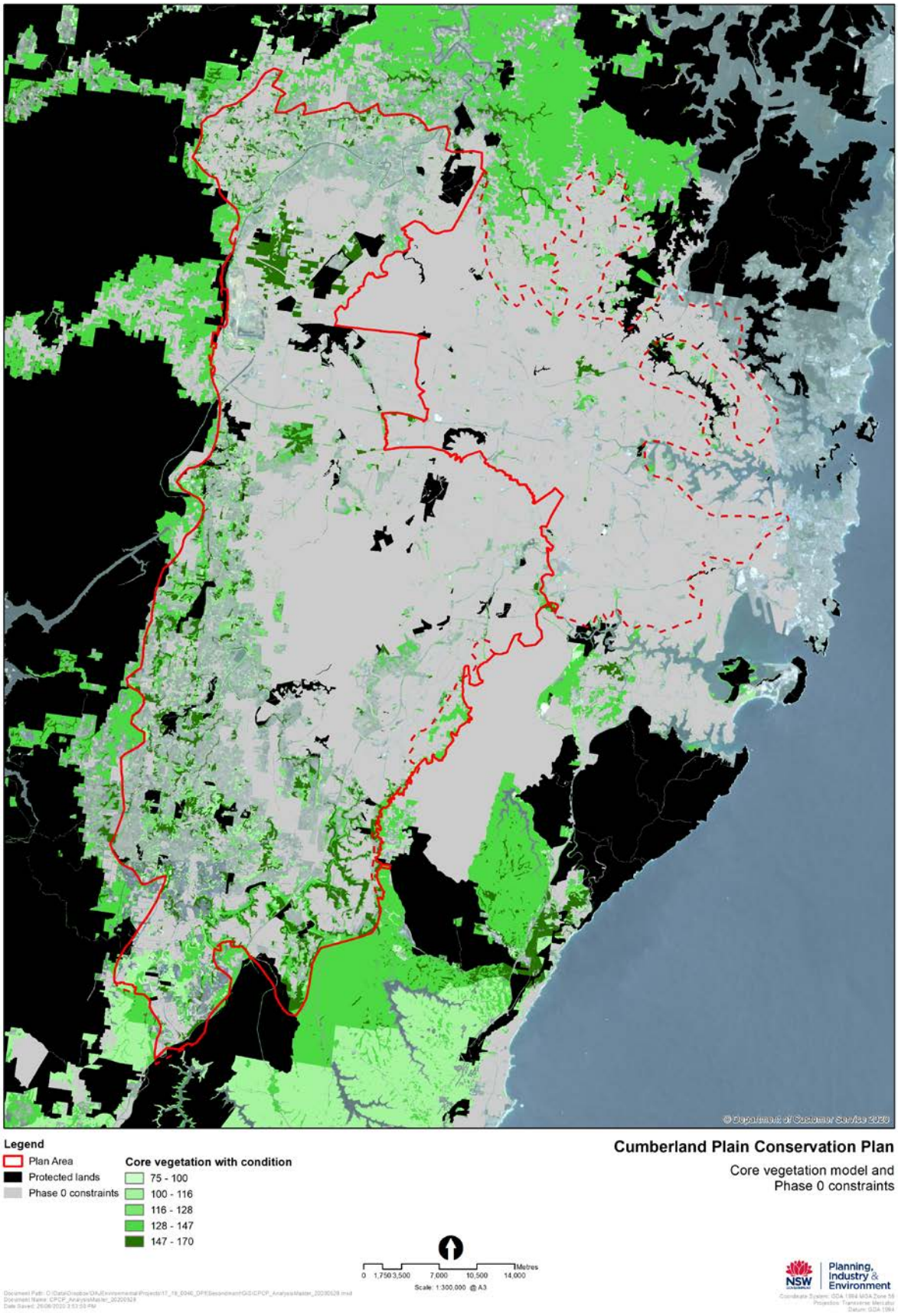


Figure 5: Phase 0 Constraints spatial output

Impact assessment results and offset target method

Impact assessment results

The impact assessment results identify which PCTs, threatened species and other MNES are impacted, and the quantum of the impact. This data helps ensure that the proposed conservation measures adequately address the biodiversity values being impacted. The impacted PCTs, TECs, MNES and species habitat are identified as ‘targets’ and are the focus for offsetting under the Plan. This focus ensures the integration of adequate representation of impacted entities into the offset program.

Table 1: Native vegetation impacts results (BC Act)

PCT number	PCT name	TEC name	BC status	Total impacts
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	52.2
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	36.9
781	Coastal freshwater lagoons of the Sydney Basin Bioregion and South East corner bioregion	*Freshwater Wetlands on Coastal Floodplains*	Endangered	2.1
830	Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin bioregion	*Moist Shale Woodland*	Endangered	0.1
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin bioregion	*River-Flat Eucalypt Forest*	Endangered	165.1
849	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin bioregion	*Cumberland Plain Woodland*	Critically endangered	729.8
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin bioregion	*Cumberland Plain Woodland*	Critically endangered	284.8
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	487.7
1800	Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter Valley	*Swamp Oak Floodplain Forest*	Endangered	19.2
			TOTAL	1,777.8

Table 2: Threatened species impacts on potential habitat (extract)

Species name	Common name	Type	Credit class	EPBC	BC	Total Impacts (ha)
Anthochaera phrygia	Regent Honeyeater	Bird	Species / ecosystem	Critically Endangered	Critically endangered	1,284.9
Lathamus discolor	Swift Parrot	Bird	Species / ecosystem	Critically Endangered	Endangered	1,284.9
Pimelea spicata	Spiked Rice-flower	Flora	Species	Endangered	Endangered	955.6
Acacia pubescens	Downy Wattle, Hairy Stemmed Wattle	Flora	Species	Vulnerable	Vulnerable	791.7
Myotis macropus	Southern Myotis	Mammal	Species	Not listed	Vulnerable	745.3
Meridolum corneovirens	Cumberland Plain Land Snail	Invertebrate	Species	Not listed	Endangered	736.4
Pteropus poliocephalus	Grey headed Flying-fox	Mammal	Species / ecosystem	Vulnerable	Vulnerable	723.1
Dasyurus maculatus maculatus	Spot-tailed Quoll, Spotted-tail Quoll	Mammal	Ecosystem	Endangered	Vulnerable	675.5
Grevillea juniperina subsp. Juniperina	Juniper-leaved Grevillea	Flora	Species	Not listed	Vulnerable	457.8
Marsdenia viridiflora subsp. viridiflora	Marsdenia viridiflora subsp. viridiflora	Flora	Species	Not listed	Endangered	412.3
Petaurus norfolcensis	Squirrel Glider	Mammal	Species	Not listed	Vulnerable	322.1

Offset target method

An offset target method is used to determine the offset requirements for each impacted PCT (also called targeted PCTs), TEC and threatened species potential habitat. The Department uses the following method to quantify (in hectares) the amount of land-based conservation required to offset the impacts under the Plan. This method is based on prioritising the most important conservation values and is consistent with the BAM's approach to:

- conservation status – impacts to higher conservation status entities require more offsets than entities of a lower conservation status
- condition – impacts to higher-quality areas require more offsets than lower-quality areas.

The following tables explicitly recognise that conservation measures under the Plan will be delivered strategically, and that this approach will provide a landscape-scale ecological benefit.

The offset target method for threatened ecological communities and species listed under the BC Act and EPBC Act is used to calculate the area needed to offset the impacts from development for each PCT (in hectares) and species' potential habitat (in hectares). This ensures that the proposed conservation lands adequately address the biodiversity values being impacted.

Table 3: Vegetation offset target method (ratio – hectares)

Conservation significance	Condition: DNG/ Scattered	Condition: Thinned	Condition: Intact
TEC	1	1.5	2
VEC	2	2.5	3
EEC	2.5	3	4
CEEC	3	4	5

Table 4: Threatened species offset target method (ratio - hectares)

Conservation significance	Condition: DNG/ Scattered	Condition: Thinned	Condition: Intact
Vulnerable	2	2.5	3
Endangered	2.5	3	4
Critically Endangered	3	4	5

Offset targets

The total offset for targeted PCTs is 6,080 ha, based on the impacts assessed under the Plan (see Table 5). The Plan proposes to secure 90 % of this target within conservation lands, which represents 5,475 ha.

The offset target has been reduced by 10% to apply that component of the conservation program's funding to supporting actions that are necessary for the successful implementation of the Plan. These supporting actions include extending services for landowners, compliance, managing

landscape-scale threats to biodiversity, research and community engagement to deliver the Plan's outcomes.

Table 5: Native vegetation impacts and targets (BC Act)

PCT number	PCT name	TEC name	BC status	Total impacts	Total target	Total target (90%)
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	52.2	165	150
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	36.9	125	110
781	Coastal freshwater lagoons of the Sydney Basin Bioregion and South East corner bioregion	*Freshwater Wetlands on Coastal Floodplains*	Endangered	2.1	5	5
830	Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin bioregion	*Moist Shale Woodland*	Endangered	0.1	0.3*	0.2*
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin bioregion	*River-Flat Eucalypt Forest*	Endangered	165.1	500	450

849	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin bioregion	*Cumberland Plain Woodland*	Critically Endangered	729.8	2,585	2,325
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin bioregion	*Cumberland Plain Woodland*	Critically Endangered	284.8	935	845
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	487.7	1,710	1,540
1800	Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter Valley	*Swamp Oak Floodplain Forest*	Endangered	19.2	6**0**	50
			TOTAL	1,777.8	6,085	5,475

Table 6: Native vegetation impacts and targets (EPBC Act)

PCT number	TEC name	EPBC status	Total impacts	Total target	Total target (90%)
724, 849, 850	*Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest*	Critically endangered	154.7	635	575
725	*Cooks River/Castlereagh Ironbark Forest*	Critically endangered	26.3	115	105
835	*Coastal floodplain eucalypt forest of eastern Australia**	n/a	210.2	640	575
1395	*Shale Sandstone Transition Forest in the Sydney Basin bioregion*	Critically endangered	191.8	795	715

1800	*Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community*	Endangered	1.8	5	5
		TOTAL	**584.8**	**2,190**	**1,975**

Most of the offsetting for species habitat will be done through the conservation lands identified to offset PCTs. It is proposed, for most species, that this is done by protecting potential habitat rather than the confirmed presence of the species.

Table 7: Threatened species impacts and targets for potential habitat (extract)

Species name	Common name	Type	Credit class	EPBC	BC	Total Impacts	Total target	Total target (90%)
Anthochaera phrygia	Regent Honeyeater	Bird	Species / ecosystem	Critically Endangered	Critically endangered	1,284.9	4,970	4,470
Lathamus discolor	Swift Parrot	Bird	Species / ecosystem	Critically Endangered	Endangered	1,284.9	4,970	4,470
Pimelea spicata	Spiked Rice-flower	Flora	Species	Endangered	Endangered	955.6	2,565	2,310
Acacia pubescens	Downy Wattle, Hairy Stemmed Wattle	Flora	Species	Vulnerable	Vulnerable	791.7	1,835	1,650
Myotis macropus	Southern Myotis	Mammal	Species	Not listed	Vulnerable	745.3	1,810	1,630
Meridolum corneovirens	Cumberland Plain Land Snail	Invertebrate	Species	Not listed	Endangered	736.4	2,305	2,075
Pteropus poliocephalus	Grey headed Flying-fox	Mammal	Species / ecosystem	Vulnerable	Vulnerable	723.1	1,760	1,585
Dasyurus maculatus maculatus	Spot-tailed Quoll, Spotted-tail Quoll	Mammal	Ecosystem	Endangered	Vulnerable	675.5	2,135	1,925

Grevillea juniperina subsp. Juniperina	Juniper-leaved Grevillea	Flora	Species	Not listed	Vulnerable	457.8	1,105	995
Marsdenia viridiflora subsp. viridiflora	Marsdenia viridiflora subsp. viridiflora	Flora	Species	Not listed	Endangered	412.3	1,250	1,125
Petaurus norfolcensis	Squirrel Glider	Mammal	Species	Not listed	Vulnerable	322.1	810	730

For specific 'target species', likely to be at risk of residual adverse direct impacts, the protection of known habitats across several locations will be required to meet the offset targets.

Table 8: Target species list

Target species name	Common name	EPBC status	BC status
Cynanchum elegans	White-flowered Wax Plant	Endangered	Endangered
Dillwynia tenuifolia	Dillwynia tenuifolia	Not listed	Vulnerable
Epacris purpurascens var. purpurascens	Epacris purpurascens var. purpurascens	Not listed	Vulnerable
Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	Not listed	Vulnerable
Hibbertia fumana	Hibbertia fumana	Not listed	Critically endangered
Hibbertia puberula	Hibbertia puberula	Not listed	Endangered
Lathamus discolor	Swift Parrot	Critically endangered	Endangered
Marsdenia viridiflora subsp. Viridiflora	Marsdenia viridiflora subsp. viridiflora	Not listed	Endangered
Meridolum corneovirens	Cumberland Plain Land Snail	Not listed	Endangered
Myotis macropus	Southern Myotis	Not listed	Vulnerable
Persoonia nutans	Nodding Geebung	Endangered	Endangered
Phascolarctos cinereus	Koala	Vulnerable	Vulnerable
Pimelea spicata	Spiked Rice-flower	Endangered	Endangered
Pultenaea parviflora	Sydney Bush-pea	Vulnerable	Endangered

Pultenaea pedunculata	Matted Bush-pea	Not listed	Endangered

Fusion analysis

Combining the ecological assessment's core vegetation model with the Phase 0 constraints output indicates how much land with remaining high biodiversity value is potentially available for offset.

The fusion analysis then identifies specific model thresholds for each target PCT based on:

- the calculated impacts
- the required offset target
- the potential land available for each target PCT after applying the Phase 0 constraints layer.

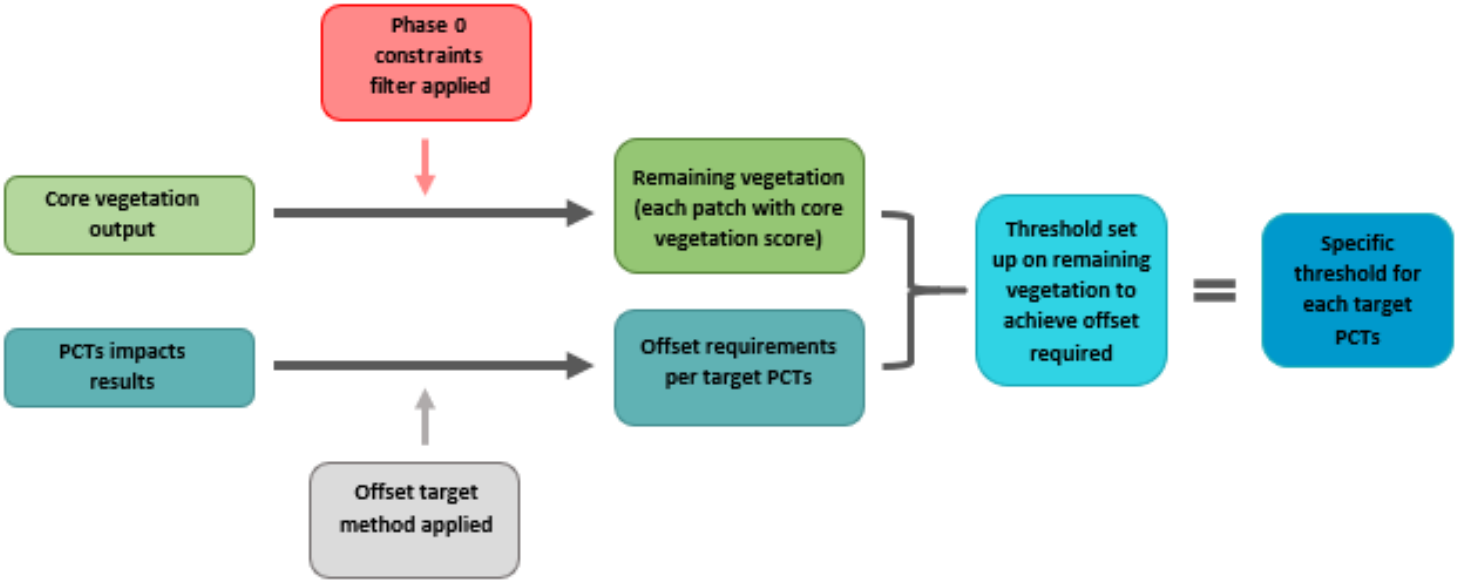


Figure 6: Fusion analysis model

The fusion analysis is designed to identify how much of each PCT is required to offset predicted impacts, with the threshold for each PCT set independently. The threshold is based on the impact, predicted offset required and the amount of each PCT remaining in the landscape after applying the Phase 0 layer. For some target PCTs, the threshold is high because only the best available vegetation is needed to offset impacts. This may be due to the PCT having a low target (that is, not much impact) or a significant amount of the specific PCT is available in the landscape.

For some target PCTs, the required threshold is low as most (or all) of the available PCTs are needed to offset the proposed impact. Thresholds for non-target PCTs are set based on the top 50% of results for that PCT.

Table 9: Fusion model output extract

PCT number	Model score	Phase 0 constrained (ha)	Not constrained (ha)	Grand Total	Target	Threshold
724	115.5	178.4	52.4	230.8	Target	

724	133	240.9	25.9	266.8	Target	
724	139	245.5	84.0	329.4	Target	
724	150.5	217.6	22.7	240.3	Target	
724	156.5	178.5	70.8	249.3	Target	Above
724	162.5	133.3	14.0	147.3	Target	Above
724	168	13.7	2.0	15.7	Target	Above
724	174	62.4	5.8	68.1	Target	Above
724	180	267.6	64.4	332.1	Target	Above
724	197.5	160.0	15.7	175.7	Target	Above
724	215	970.8	60.1	1,031.0	Target	Above
	724 Total	**2,668.7**	**417.7**	**3,086.4**		

The output of this analysis identifies all vegetation remaining in the Plan Area, and differentiates:

- targeted PCTs needed to offset impacts
- targeted PCTs that are not needed to offset impacts (that is, residual PCTs)
- non-target PCTs in top 50% of model results
- non-target PCTs in bottom 50% of model results
- PCTs currently constrained (that is, Phase 0 constraints).

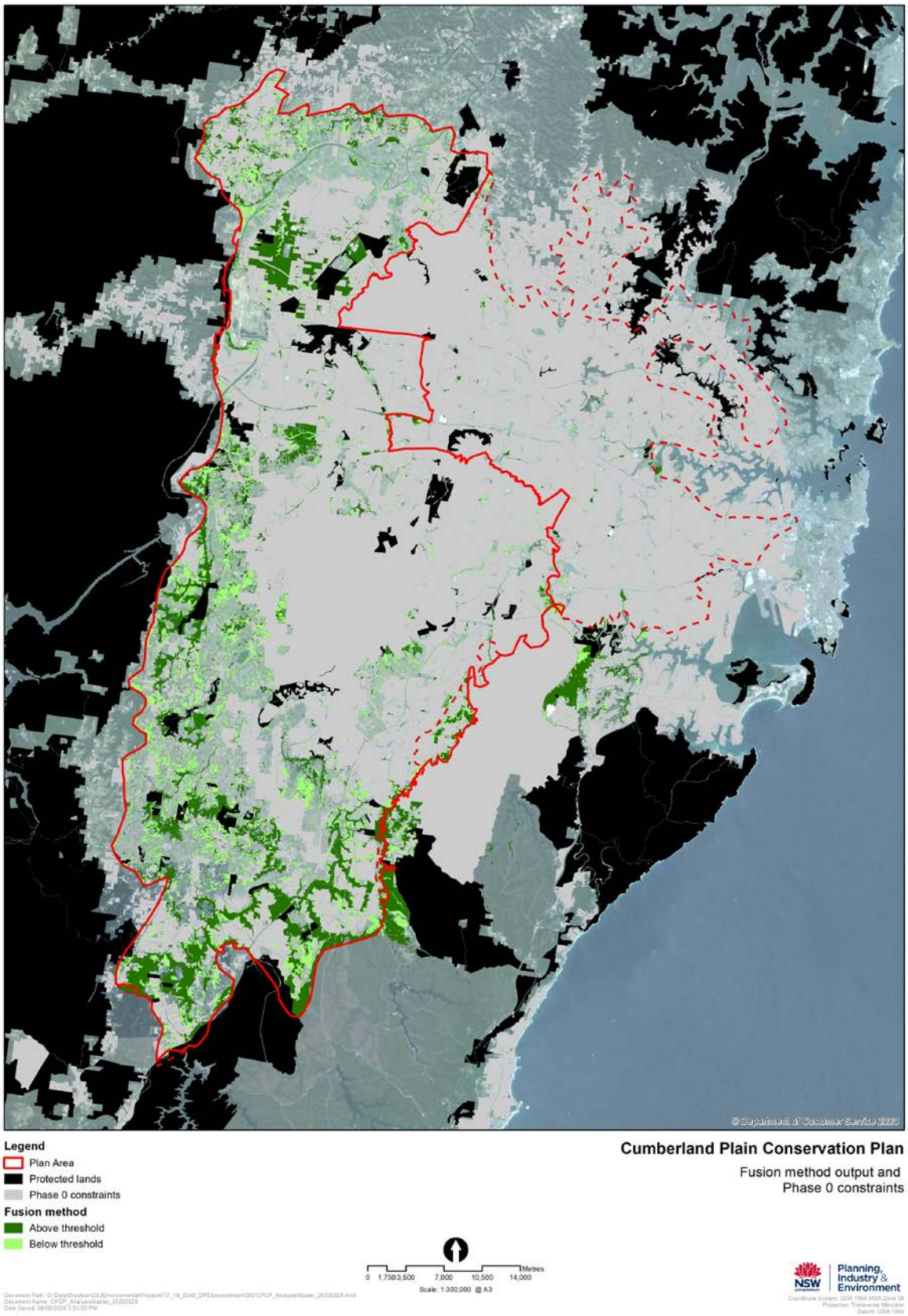


Figure 7: Fusion model output extract

Stage 2 – Constraints assessment model

Phase 1 constraints

The remaining vegetation and species habitat available for potential offset (after Phase 0) is assessed for constraints that could challenge the implementation of conservation measures and establishment of conservation lands. In identifying these constraints, consistent with Principle 4 of the draft guidelines for planning authorities, conservation lands can be chosen in locations that provide the optimum opportunity to improve biodiversity values and landscape function in the long term.

Each remaining vegetation patch is scored against these criteria. The higher the score, the lower the level of potential constraint.

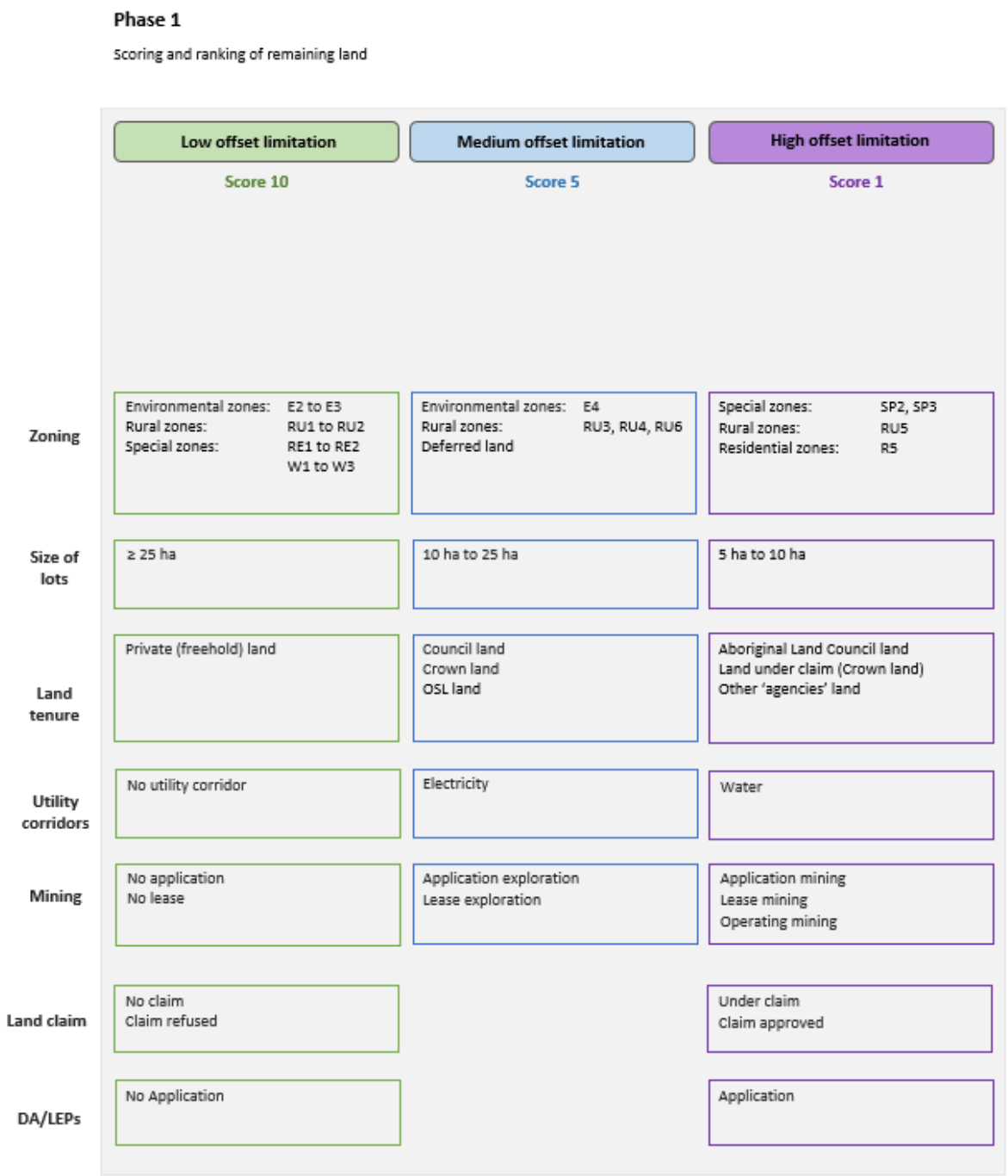


Figure 8: Phase 1 constraints model

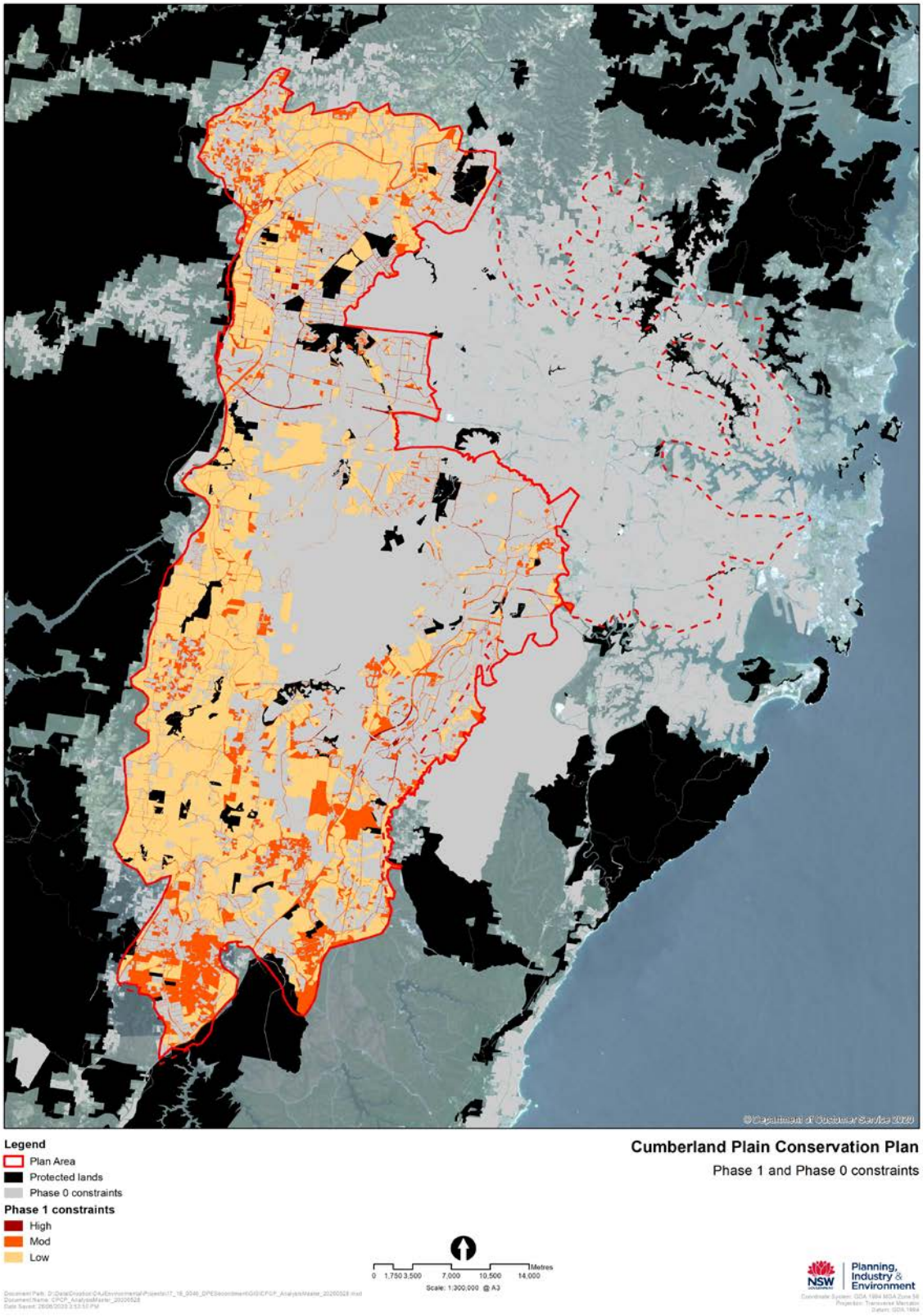


Figure 9: Phase 1 constraints spatial output

Stage 3 – Conservation priorities assessment and offset selection method

Priority areas are identified once constraints have been established for all remaining available vegetation.

Offsetting for the Plan

To deliver landscape-scale biodiversity conservation outcomes, the offset selection approach aligns with:

- the Plan's objectives
- the BC Act and the draft guidelines for planning authorities
- the EPBC Act and its offset policy.

Selection approach for potential offset areas

Suitable offset areas are selected from the ground up – from PCTs, TECs, threatened species potential habitat and other MNES to the landscape scale.

The following steps are taken to identify potential offset areas:

- Identify all large target PCTs above the threshold and select them as 'core' patches.
- Identify all target PCTs below the threshold, adjacent to 'core' patches, and add them to the selection.
- Identify all non-target PCTs above the threshold that are adjacent to 'core' patches and add them to the selection.
- Identify corridors that connect selected areas.
- Remove small and isolated patches from the selection (as they would be difficult to manage and unlikely to be viable in the long term).
- Remove parts of lots presenting partial Phase 0 constraints (that were not picked up by previous stages).
- Add species-specific habitat (when it is not already captured by the selection).
- Add relevant MNES sites (when they are not already captured by the selection).
- Add sites not identified through previous stages that offer an opportunity for ecological restoration as a significant contributor to connectivity or that are required for target PCTs with an offset shortfall.

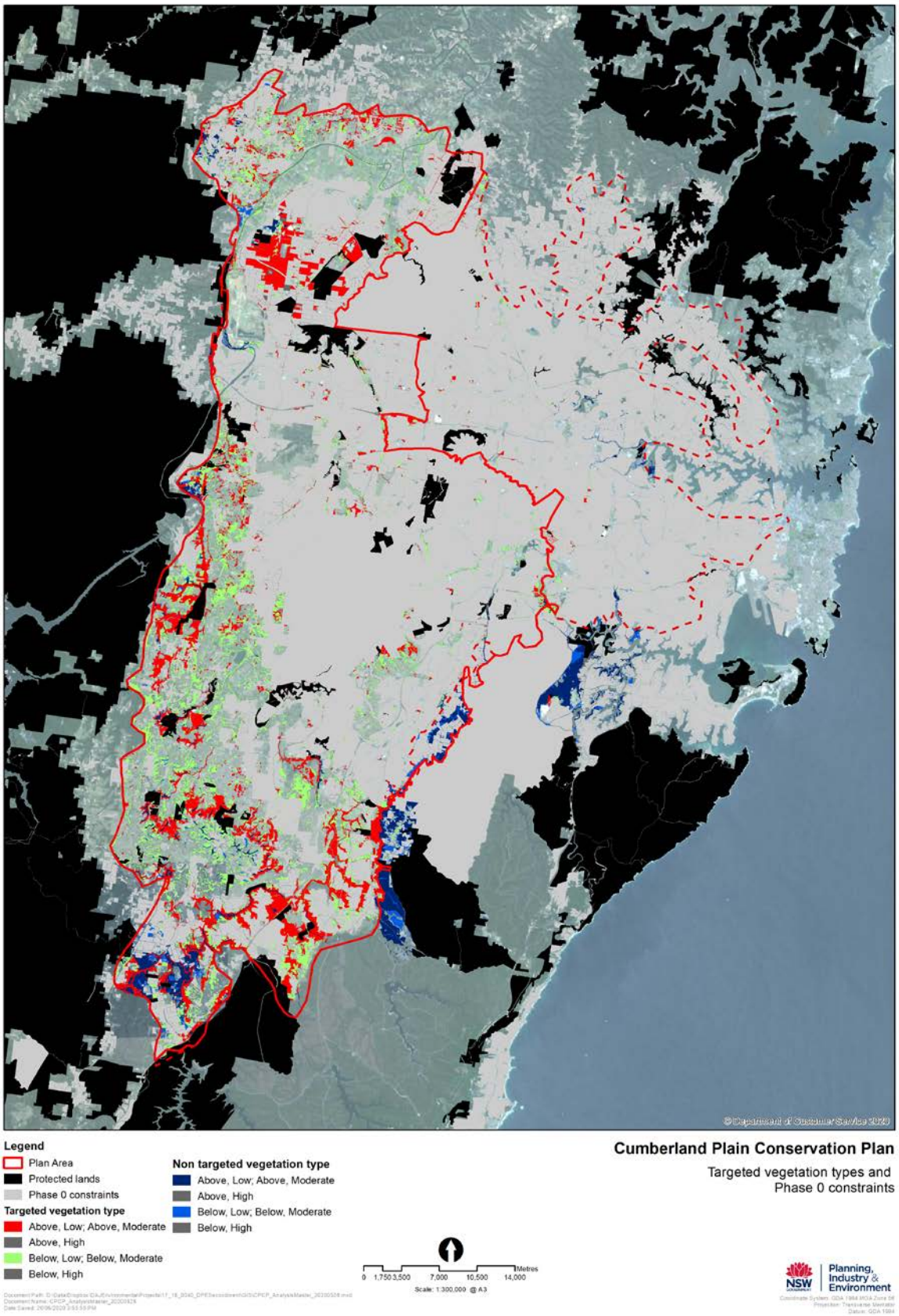


Figure 10: Selection model spatial output

The Model output

The selected areas are known as the strategic conservation area (SCA), while areas that will be prioritised for further investigation are known as conservation priority areas (CPA).

The CPA will be divided into offset units (OUs) and categorised as either potential reserves or biodiversity stewardship sites (BSAs).

The remaining of the SCA will be divided into 'backup units' that can be re-prioritised if an offset unit becomes unavailable.

Identifying potential offset areas outside the Plan Area

To identify further areas for potential offset locations within the Cumberland subregion and adjacent subregions, stages 1, 2 and 3 of the Method will be applied to a 20-kilometre buffer surrounding the Plan Area. The output will support the identification of alternate potential conservation lands, in accordance with the Conservation lands selection steps identified in the Plan.

Stage 4 – Ground-truthing program

Each offset unit undergoes a ground-truthing process to confirm the validity/robustness of the area as a biodiversity offset and the values present. Those areas confirmed to have the required biodiversity values (and other attributes) will be prioritised as targets for conservation lands for the Plan and further developed into implementation proposals.

The ground-truthing process involves over-the-fence style assessments with observations generally made at some distance from the property. Therefore, the results of the ground-truthing are indicative only and will be updated when on-ground assessments are conducted.

Desktop assessment and aerial verification, and refinement of offset units

All offset units undergo the following desktop and aerial assessments prior to an on-ground rapid assessment:

- Update vegetation mapping (extent and condition) – based on recent aerial photos, areas of regrowth are added to the vegetation mapping for each offset unit, with areas of clearing removed from the layer. Obvious changes in condition (that is, where vegetation had been thinned) are also recorded.
- Identify areas for restoration (extent and condition) – based on the vegetation condition, the effort required to manage and restore areas are estimated and categorised as either 'Active management (intensive weed control)', 'Active management (restoration)', 'Active management (thinned/scattered condition)' or 'Passive management (intact/thinned condition)'
- Identify management issues – areas of weed infestation or other management issues (for example, dumping) are identified using recent aerial photos
- Identify roads and easements– layers obtained from NSW Spatial Services (cadastre, water, roads and easements) are used to identify areas within potential offset sites with constraints that may limit vegetation management or restoration activities. These areas are mapped separately to ensure management and restoration efforts are not over-estimated
- Extract houses and major buildings (including 50 metres fire-related asset protection zones (APZs)) – houses and other large outbuildings are identified, including providing a 50 m buffer. This distance represents an average APZ around each house should a BSA be set up

- Adjust boundaries adjustment – boundaries are adjusted for each offset unit, and areas added or removed, based on management requirements and issues identified.

A desktop assessment is also conducted on backup units, including adjusting boundaries, and identifying roads and easements, and restorations. Should a backup unit be upgraded to an offset unit, more detailed ground-truthing will be conducted.

The results of this assessment are presented to delivery partners for feedback.

'Over-the-fence' on-ground rapid assessment and refinement of offset units

All offset units undergo an on-ground over-the-fence rapid assessment across specific sites. A team led by a BAM-accredited assessor visits each site and collects ecological data using a fit-for-purpose Rapid Assessment Method (RAM) digital form.

The form was created through Survey123, an ArcGIS app from Esri. It allows inputting of information during the on-ground assessment and uploading to ArcGIS Online.

The results are then downloaded as a geodatabase, and subsequently integrated into the strategic conservation area layer.

The results of this on-ground rapid assessment leads to:

- updated vegetation mapping – areas of native vegetation are updated, based on the results of the field assessment. The PCTs allocated to vegetation polygons are updated where field observations supported this. Areas of proposed restoration are also assigned PCTs
- boundary adjustments – where ground-truthing identified new issues, the boundaries of the offset units are changed, with areas added or removed.

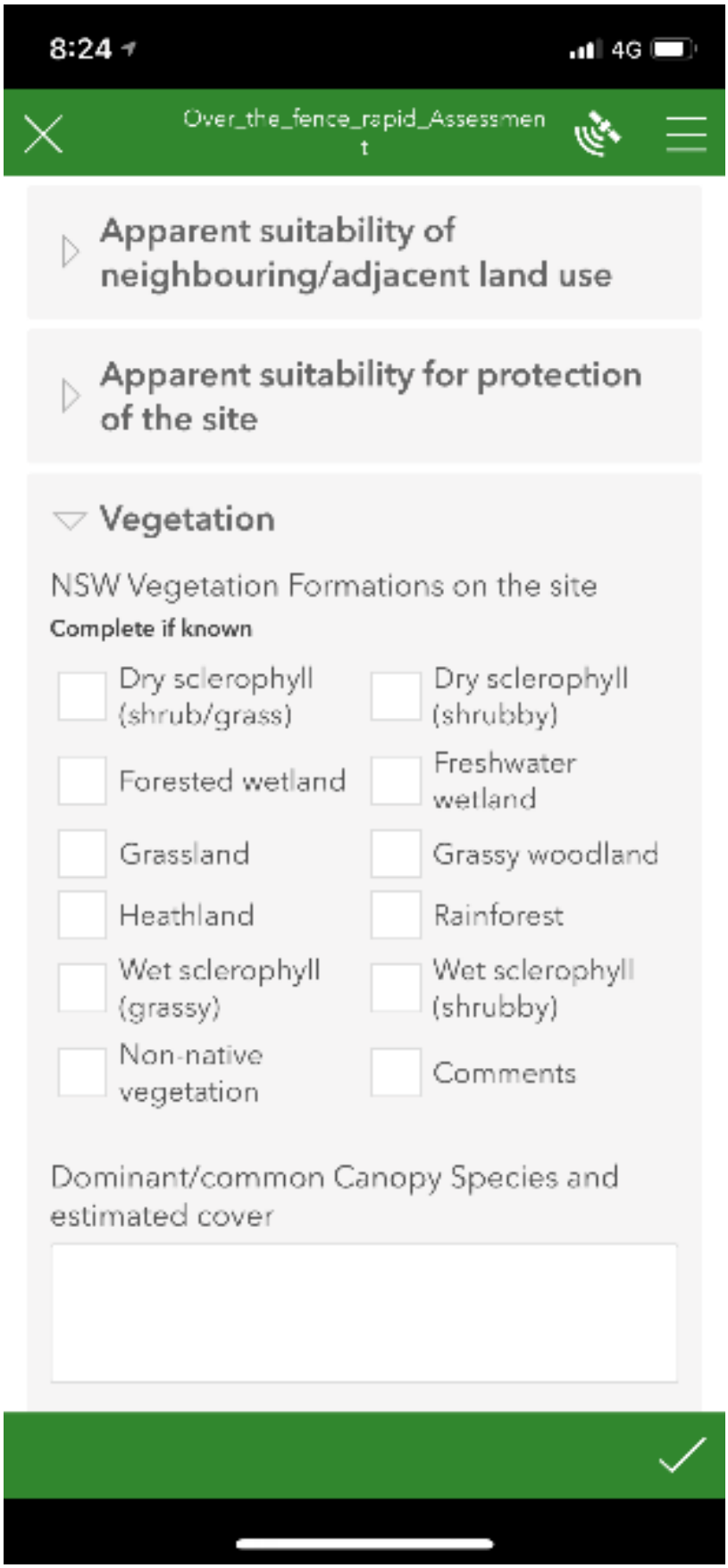


Figure 11: RAM digital form extract

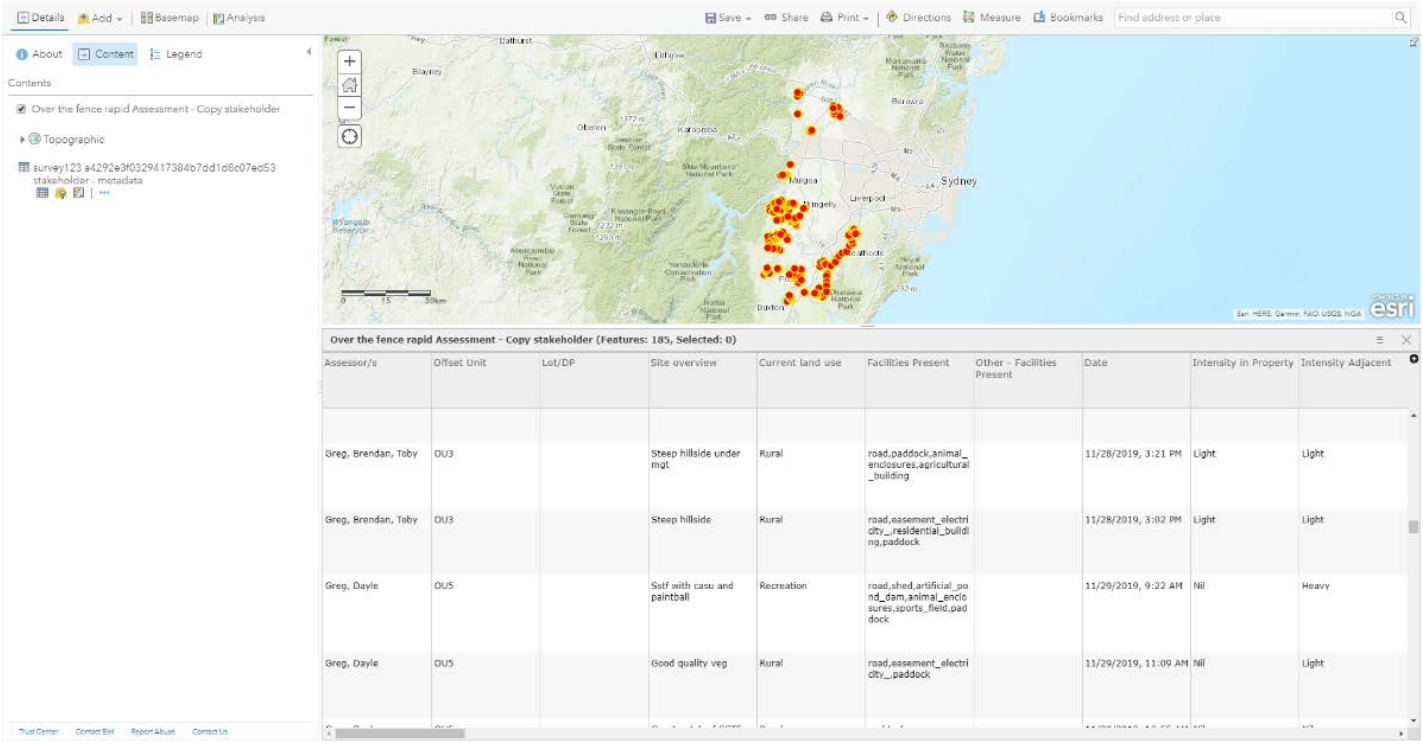


Figure 12: RAM data overview

Development of implementation proposal for each offset unit

Each updated offset unit will be developed into a high-level implementation proposal, in collaboration with delivery partners. The proposal will include:

- a description of the Plan Area
- detailed profiling
- selection rational
- the benefits to landscape conservation
- proposed staging
- ecological restoration activities.

Conservation Priorities Method – Results

The application of the Method provides viable locations for offsets that address impacts to biodiversity in the nominated areas of the Plan. A total of 28,300 ha was identified initially, and the Method's priority-setting processes will be used to focus on locating conservation lands to address the offset target of 4,575 ha. The outcome is described in more detail below.

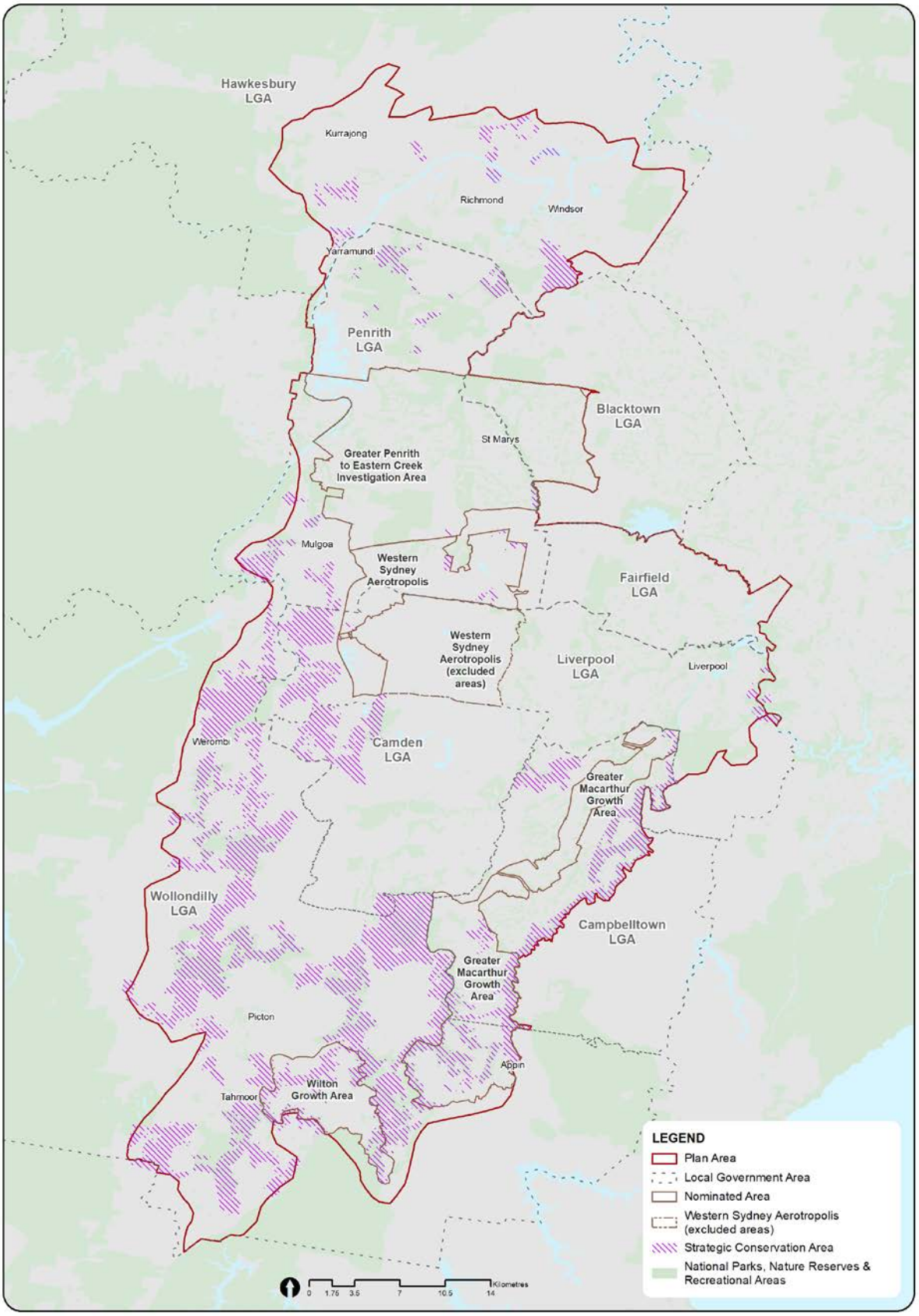


Figure 13: Strategic conservation area spatial output

The strategic conservation area identifies potential conservation sites in the Plan Area. It is approximately 28,300 ha (14% of the Plan Area).

It represents large remnants of native vegetation with good connectivity, or areas with the potential to enhance connectivity on low- to medium-constraint land.

Note: the purpose of the strategic conservation area is similar to that of the Biodiversity Investment Opportunities Map (BIO Map), but the approach includes new ecological data and incorporates planning and land use constraint data to assess the feasibility of implementing the conservation program for the Plan (and other future programs). Also, the strategic conservation area generally uses lot boundaries to identify areas, whereas BIO Map generally uses vegetation boundaries.

The conservation priority areas (CPAs) will be selected within the SCA, for further investigation as potential offset units.

Appendix E. Species and TEC-specific mitigation measures

Urban and industrial, infrastructure and agribusiness development

Mitigation measures to address residual risks to threatened fauna

HABITAT FEATURES AND CONNECTIVITY

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Retain large trees (including dead trees) (≥50cm DBH) during precinct planning where possible and avoid impacts to soil within the dripline of these trees during construction	Large trees within urban landscapes are likely to be important for the persistence of several species within the subregion. Microbats benefit directly through roosting opportunities and indirectly through foraging opportunities. Flying-foxes and nectivorous birds benefit directly through foraging opportunities (high volumes of nectar). Owls and raptors benefit indirectly through large trees providing habitat for prey species	**Microbats:** Southern Myotis, Little Bent-winged Bat, Eastern Coastal Free-tailed Bat, Large Bent-winged Bat, Yellow-bellied Sheathail-bat, Eastern False Pipistrelle, Greater Broad-nosed Bat **Flying-foxes and nectivorous birds:** Grey-headed Flying-fox, Regent Honeyeater, Swift Parrot, Little Lorikeet, Painted Honeyeater, and Black-chinned Honeyeater **Owls and raptors:** Barking Owl, Powerful Owl, Masked Owl, Little Eagle, White-bellied Sea Eagle, Square-tailed Kite, Spotted Harrier	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards.	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	Y	Y	Y	Y	

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Retain areas of high density proteaceae shrubs where possible, particularly along riparian corridors	Proteaceae shrubs such as banksias are a favoured foraging resource for the species and the species is likely to use riparian corridors as habitat or for moving between other areas of suitable habitat	Eastern Pygmy-possum	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	**Y**	**Y**	**Y**	**Y**	
If Green and Golden Bell Frog is confirmed present along Ropes Creek, consult with land managers of the riparian corridor to ensure key habitat features are protected and enhanced.	Aims to protect an important population of the species (if confirmed present) at Ropes Creek in GPEC.	Green and Golden Bell Frog	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	Consultation with local councils and other public agencies	**Y** (mapped potential habitat along Ropes Creek)	**N**	**N**	**N**	
Undertake pre-construction surveys prior to removal or disturbance (seasonally dependent, before torpor) to human made structures to ensure any roosting habitat for microbat species including mine shafts, storm water tunnels, old or derelict buildings,	Minimises the potential impacts of urban development to human-made structures that may be used by microbats for roosting or breeding.	Eastern Coastal Free-tailed Bat Little Bent-winged Bat Large Bent-winged Bat Southern Myotis Yellow-Bellied Sheathtail-Bat	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	**Y**	**Y**	**Y**	**Y**	

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
bridges and culverts are retained where possible									

PEST / DOMESTIC ANIMALS

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Modify pest control techniques implemented during construction and operation of the development and under the pest control strategy to reduce the risk of secondary poisoning (e.g. from Pindone or second-generation rodenticides).	There is a risk of pest control measures causing secondary poisoning of raptors.	White-bellied Sea-Eagle Little Eagle Square-tailed kite Spotted Harrier	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards **C16:** Manage priority pest animals in strategic locations in the Cumberland subregion to reduce threats to land protected in the strategic conservation area	**Nominated areas:** DCP; Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act **Strategic conservation area**: Pest animal implementation strategy	Y	Y	Y	Y	Strategic conservation area
Where permitted and appropriate, contain domestic cats and dogs in new residential areas during operation of the development at the urban/bushland interface consistent with relevant Council guidelines.	Increased numbers of domestic cats and dogs associated with urban development increases the threat of predation to native animals.	Eastern Pygmy-possum Spotted-tailed Quoll	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP	N	N	Y	Y	

HUMAN DISTURBANCE

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Establish minimum setbacks for urban development around flying fox camps	Minimises disturbance to known populations	Grey-headed Flying-fox	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP	**Y**	**Y**	**Y**	**Y**	
Consult with relevant resource managers to consider: Prohibiting recreational fishing along the stretches of habitat associated with Erskine Creek, Glenbrook Creek, Georges River and Cordeaux River known to support the species Installing signs / interpretive displays at appropriate sites used to access fishing locations at Erskine Creek, Glenbrook Creek, Georges River and Cordeaux River to assist with identification and awareness of threats	Minimises the risk of increased recreational fishing affecting the species due to larger urban populations associated with urban development	Macquarie Perch	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	Consultation with local councils and other public agencies	**N**	**N**	**N**	**N**	Erskine Creek Glenbrook Creek Georges River Cordeaux River

DISEASE

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
If Green and Golden Bell Frog is confirmed present along Ropes Creek, incorporate best practice site hygiene protocols to manage the potential spread of *chytrid* fungus	Minimises the risk of the spread of *chytrid* fungus due to construction activities within potential habitat for the species	Green and Golden Bell Frog	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	**Y** (mapped potential habitat along Ropes Ck)	**N**	**N**	**N**	
Incorporate best practice site hygiene protocols to manage the potential spread of pathogens, such as *Phytophthora* and Myrtle Rust within or adjacent to potential habitat for relevant species	Minimises the risk of the spread of pathogens due to construction activities adjacent to potential habitat for the species	Greater Glider	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	**Y**	**Y**	**Y**	**Y**	

OTHER

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Consult with relevant land managers to implement critical actions for Cumberland Plain Land Snail under the Save our Species program (EES, 2020) on public land adjacent to urban development during construction and operation of the development, taking into account relevant guidance in the Weed Control Implementation Strategy and the Fire Management Strategy	Minimises indirect impacts to Cumberland Plain Land Snail adjacent to urban capable land	Cumberland Plain Land Snail Key indirect impacts/threats to be managed are: • Weed invasion • Inappropriate fire regimes • Removal of fallen logs for firewood and slashing of habitat	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	Consultation with local councils and other public agencies Weed Control Implementation Strategy Fire Management Strategy	Y	Y	Y	Y	
Implement 'open structure design' when designing structures such as roads adjacent to known populations of Cumberland Plain Land Snail where possible, consistent with the critical actions for this species under the Save our Species program (EES 2020)	Development in the nominated areas may isolate patches of habitat. This action is consistent with a critical action for this species under the Save our Species program (EES 2020)	Cumberland Plain Land Snail	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	Consultation with local councils and other public agencies	Y	Y	Y	Y	

Mitigation measures to address residual risks to flora

WEED INVASION

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Implement mitigation measures to manage weeds for flora populations and habitat adjacent to major infrastructure corridors during construction and operation of the development, taking into account relevant guidance in the Weed Control Implementation Strategy	Minimises indirect impacts to flora populations and habitat adjacent to major infrastructure corridors	*Dillwynia tenuifolia* *Pultenaea parviflora* *Persoonia nutans*	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards **C16:** Manage priority weeds in strategic locations in the Cumberland subregion to reduce threats to land secured within the strategic conservation area	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under the EP&A Act Weed Control Implementation Strategy	**Y**	**Y**	**N**	**N**	
As above	As above	*Pultenaea pedunculata*	C5 and C16	As above	**N**	**N**	**Y**	**N**	
As above	As above	*Grevillea parviflora* subsp. *parviflora* (important pop. no. 104)	C5 and C16	As above	**N**	**N**	**N**	**Y**	

ALTERED FIRE REGIME

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Consult with land managers of land containing known populations or habitat for relevant species to mitigate indirect impacts from fire during construction and operation of the development, taking into account guidance in the Fire Management Strategy	Minimises indirect impacts to flora populations and habitat adjacent to urban capable land	*Dillwynia tenuifolia* *Grevillea juniperina* subsp. *juniperina* *Pultenaea parviflora*	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards **C18:** Manage fire in strategic locations in the Cumberland subregion to support the maintenance of biodiversity values on conservation land	Consultation with local councils and other public agencies Fire Management Strategy	Y	Y	N	N	
As above	As above	*Persoonia nutans*	C5 and C18	As above	Y	N	N	N	
As above	As above	*Pultenaea pedunculata*	C5 and C18	As above	N	N	Y	N	
As above	As above	*Grevillea parviflora* subsp. *parviflora* (important population no. 104)	C5 and C18	As above	N	N	N	Y	
As above	As above	*Persoonia bargoensis*	C5 and C18	As above	N	N	Y	Y	

HUMAN DISTURBANCE

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Consult with land managers of land containing known populations or habitat for relevant species to mitigate indirect impacts from human disturbance during construction and operation of the development, including controlling public access, managing maintenance activities such as mowing and slashing, and managing rubbish dumping	Minimises indirect impacts to flora populations and habitat adjacent to urban capable land	*Dillwynia tenuifolia* *Grevillea juniperina* subsp. *Juniperina* *Pultenaea parviflora*	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards **C5.3:** This includes consulting with public land managers to minimise exposure to human disturbance for the specified threatened species	Consultation with local councils and other public agencies	Y	Y	N	N	
As above	Minimises indirect impacts to flora populations and habitat adjacent to urban capable land	*Persoonia nutans*	C5 and C5.3	As above	Y	N	N	N	
As above	Minimises indirect impacts to flora populations and habitat adjacent to urban capable land	*Grevillea parviflora* subsp. *parviflora* (important population no. 104)	C5 and C5.3	As above	N	N	N	Y	
As above	Minimises indirect impacts to flora populations and habitat adjacent to urban capable land	*Pultenaea pedunculata* *Genoplesium baueri* (important population no. 21)	C5 and C5.3	As above	N	N	Y	N	

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
As above	Minimises indirect impacts to flora populations and habitat adjacent to urban capable land	*Persoonia bargoensis* *Melaleuca deanei* *Pterostylis saxicola*	C5 and C5.3	As above			Y	Y	
As above	Minimises indirect impacts to flora populations and habitat adjacent to urban capable land	*Pimelea spicata* Ensure weed management activities involving the use of herbicides will minimise risks and maintain the species	C5 and C5.3	As above	Y	Y	Y	Y	

DISEASE

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Incorporate best practice site hygiene protocols to manage the potential spread of pathogens, such as Phytophthora and Myrtle Rust adjacent to potential habitat for relevant species	Minimises the risk of the spread of pathogens due to construction activities adjacent to potential habitat for the species	*Persoonia bargoensis*	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	**N**	**N**	**Y**	**Y**	
As above	As above	*Persoonia nutans*	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	**Y**	**Y**	**N**	**N**	

Mitigation measures to address residual risks to threatened ecological communities

Mitigation measure	Rationale for measure	Threatened ecological community	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
When implementing mitigation measures to manage indirect impacts to Cooks River/Castlereagh Ironbark Forest, undertake mitigation in accordance with Best Practice Guidelines: Cooks River/Castlereagh Ironbark Forest (NSW DECC, 2008) within and adjacent to the TEC	Minimises the risk of several indirect impact types on the TEC adjacent to urban development and major infrastructure corridors	Cooks River/Castlereagh Ironbark Forest (NSW and Cth)	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	**N**	**Y** (Kemps Creek)	**N**	**N**	
Incorporate best practice site hygiene protocols to manage the potential spread of pathogens, such as *Phytophthora* and Myrtle Rust adjacent to potential habitat for relevant TECs	Minimises the risk of the spread of pathogens due to construction activities for urban development or major infrastructure corridors adjacent to TECs	Cooks River/Castlereagh Ironbark Forest (NSW and Cth)	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under EP&A Act	**N**	**Y** (Kemps Creek)	**N**	**N**	
As above	As above	Cumberland Plain Woodland (NSW and Cth)	**C5**	As above	**Y**	**Y**	**N**	**N**	
As above	As above	River-flat Eucalypt Forest (NSW)/ Coastal Floodplain Eucalypt Forest (Cth)	**C5**	As above	**Y**	**Y**	**Y**	**Y**	

Mitigation measure	Rationale for measure	Threatened ecological community	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
As above	As above	Shale Gravel Transition Forest (NSW)	**C5**	As above	**Y**	**Y** (Kemps Creek)	**N**	**N**	
As above	As above	Shale Sandstone Transition Forest (NSW and Cth)	**C5**	As above	**N**	**N**	**Y**	**Y**	
As above	As above	Swamp Oak Floodplain Forest (NSW)/Coastal Swamp Oak Forest (Cth)	**C5**	As above	**Y**	**Y**	**N**	**N**	

Mitigation measures to address residual risks to other protected matters

Mitigation measure	Rationale for measure	Protected matter	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Ensure development adjacent to the southern and western boundaries of Commonwealth land comprising the Orchid Hills Defence Establishment mitigates impacts to surface water flows and the water quality of Blaxland Creek	Minimises the risk of indirect impacts from hydrological disturbance on an important waterway on Commonwealth land that occurs adjacent to urban development	Commonwealth Land	**C5:** Mitigate indirect and prescribed impacts on threatened species, populations and communities to best practice standards	DCP Guidelines for infrastructure assessment including state significant development and Part 5 activities under the EP&A Act					Orchard Hills Defence Site

Mitigation measures for major infrastructure corridors

Mitigation measures to address residual risks to threatened fauna

HABITAT FEATURES AND CONNECTIVITY

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Incorporate artificial breeding and roosting habitat (e.g. bat boxes, structural cavities) in the design of bridges associated with the major infrastructure corridors in accordance with relevant guidelines or standards	Minimises the potential impacts of the major infrastructure corridors to human-made structures that may be used by microbats for roosting or breeding	Eastern Coastal Free-tailed bat Little Bent-winged Bat Large Bent-winged Bat Southern Myotis Yellow-Bellied Sheathtail-bat	**C6:** Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on threatened species and their habitat	State Significant Infrastructure assessment and approval					All major infrastructure corridors within and outside nominated areas

DISEASE

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
If Green and Golden Bell Frog is confirmed present along Ropes Creek, incorporate best practice site hygiene protocols to manage the potential spread of *chytrid* fungus	Minimises the risk of the spread of *chytrid* fungus due to construction activities within potential habitat for the species	Green and Golden Bell Frog	**C6:** Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on threatened species and their habitat	State Significant Infrastructure assessment and approval					Outer Sydney Orbital (mapped potential habitat along Ropes Creek)
Incorporate best practice site hygiene protocols to manage the potential	Minimises the risk of the spread of pathogens due to	Greater Glider	**C6:** Mitigate indirect and prescribed impacts on	State Significant Infrastructure					All major infrastructure corridors

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
spread of pathogens, such as *Phytophthora* and Myrtle Rust within or adjacent to potential habitat for relevant species	construction activities adjacent to potential habitat for the species		threatened species from major infrastructure (transport) development on threatened species and their habitat	assessment and approval					within and outside nominated areas

OTHER

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Consult with relevant land managers to implement mitigation measures to manage indirect impacts to known populations and habitat for Cumberland Plain Land Snail on public land adjacent to major infrastructure corridors during construction and operation of the development, taking into account relevant guidance in the Weed Control Implementation Strategy and the Fire Management Strategy	Minimises indirect impacts to Cumberland Plain Land Snail adjacent to major infrastructure corridors	Cumberland Plain Land Snail Key indirect impacts/threats to be managed are: • Weed invasion • Inappropriate fire regimes • Removal of fallen logs for firewood and slashing of habitat	**C6:** Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on threatened species and their habitat	Consultation with local councils and other public agencies					All major infrastructure corridors within nominated areas

Mitigation measures to address residual risks to flora

WEED INVASION

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Implement mitigation measures to manage weeds for flora populations and habitat adjacent to major infrastructure corridors during construction and operation of the development, taking into account relevant guidance in the Weed Control Implementation Strategy	Minimises indirect impacts to flora populations and habitat adjacent to major infrastructure corridors	*Dillwynia tenuifolia* *Pultenaea parviflora* *Persoonia nutans*	**C6:** Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on threatened species and their habitat **C16:** Manage priority weeds in strategic locations in the Cumberland subregion to reduce threats to land secured within the strategic conservation area	State Significant Infrastructure assessment and approval					Outer Sydney Orbital in Wianamatta Regional Park M7/Ropes Crossing link Road
As above	As above	*Grevillea juniperina* subsp. *juniperina*	C6 and C16	State Significant Infrastructure assessment and approval					Outer Sydney Orbital in GPEC M7/Ropes Crossing link Road Western Sydney Freight Line

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
As above	As above	*Cynanchum elegans*	C6 and C16	State Significant Infrastructure assessment and approval					Outer Sydney Orbital at Cobbity

HYDROLOGY

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Implement mitigation measures to manage hydrology impacts to relevant flora species and habitat adjacent to major infrastructure corridors during construction and operation of the development	Minimises the risk of hydrological impacts to the species	*Cynanchum elegans*	**C6:** Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on threatened species and their habitat	State Significant Infrastructure assessment and approval					Outer Sydney Orbital at Cobbity

DISEASE

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Incorporate best practice site hygiene protocols to manage the potential spread of pathogens, such as Phytophthora and Myrtle Rust adjacent to potential habitat for relevant species	Minimises the risk of the spread of pathogens due to construction activities adjacent to potential habitat for the species	*Persoonia nutans*	**C6:** Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on	State Significant Infrastructure assessment and approval					Outer Sydney Orbital in Wianamatta Regional Park

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
			threatened species and their habitat						

TUNNELS

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
Manage key threats to the species, including: • Hydrological disturbance • Spread of weeds • Spread of infection/disease • Soil erosion and sedimentation • Ground settling or subsidence	Minimises the risk of indirect impacts during tunnel construction and operation	*Cynanchum elegans*	**C6**: Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on threatened species and their habitat	State Significant Infrastructure assessment and approval					Outer Sydney Orbital tunnel
As above	As above	*Pimelea spicata*	C6	As above					Metro Rail Future Extension tunnel
As above	As above	*Pomaderris brunnea*	C6	As above					Outer Sydney Orbital tunnel

Mitigation measures to address residual risks to threatened ecological communities

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
When implementing mitigation measures to manage indirect impacts to Cooks River/Castlereagh Ironbark Forest, undertake mitigation in accordance with Best Practice Guidelines: Cooks River/Castlereagh Ironbark Forest (NSW DECC, 2008) within and adjacent to the TEC	Minimises the risk of several indirect impact types on the TEC adjacent to urban development and major infrastructure corridors	Cooks River/Castlereagh Ironbark Forest (NSW and Cth)	**C6:** Mitigate indirect and prescribed impacts on threatened species from major infrastructure (transport) development on threatened species and their habitat	State Significant Infrastructure assessment and approval					Outer Sydney Orbital at Wianamatta Regional Park
Incorporate best practice site hygiene protocols to manage the potential spread of pathogens, such as *Phytophthora* and Myrtle Rust adjacent to potential habitat for relevant TECs	Minimises the risk of the spread of pathogens due to construction activities for urban development or major infrastructure adjacent to TECs	Cooks River/Castlereagh Ironbark Forest (NSW and Cth)	**C3:** Avoid and minimise impacts to threatened species, populations and communities within major infrastructure corridors in the nominated areas **C4:** Avoid and minimise impacts to threatened species, populations and communities in the four major infrastructure corridors outside the nominated areas	State Significant Infrastructure assessment and approval					Outer Sydney Orbital at Wianamatta Regional Park

Mitigation measure	Rationale for measure	Species	Commitment	Implementation mechanism	GPEC	WSA	GMAC	WTN	Other location
As above	As above	Cumberland Plain Woodland (NSW and Cth)	C3 and C4	State Significant Infrastructure assessment and approval					Outer Sydney Orbital adjacent to WSA Western Sydney Freight Line
As above	As above	River-flat Eucalypt Forest (NSW)/Coastal Floodplain Eucalypt Forest (Cth)	C3 and C4	State Significant Infrastructure assessment and approval	Y	Y	Y	Y	
As above	As above	Shale Gravel Transition Forest (NSW)	C3 and C4	State Significant Infrastructure assessment and approval					Outer Sydney Orbital at Wianamatta Regional Park
As above	As above	Swamp Oak Floodplain Forest (NSW)/Coastal Swamp Oak Forest (Cth)	C3 and C4	State Significant Infrastructure assessment and approval					Outer Sydney Orbital in GPEC

Appendix F. Draft evaluation questions

Table 1: Annual evaluation to track delivery of the Plan's commitments, actions, targets and outcomes

Outcome	Evaluation questions
Delivery	Have the Plan's actions been delivered? Have the Plan's targets been met? Have the Plan's commitments been achieved?
Economic	To what degree has strategic biodiversity certification or strategic assessment reduced approval times for urban development and transport infrastructure in nominated areas?
Environmental	What contribution has the Plan made to the protection and condition of riparian land and wetlands in the Plan Area? Has the Plan improved the condition and increased the extent of native vegetation in areas of the Cumberland subregion to support long-term viability and ecological connectivity? Has the Plan contributed to the persistence of populations of targeted threatened ecological plant communities in the Cumberland subregion to promote long-term viability and ecological connectivity? Has the Plan improved the persistence of targeted threatened species and the condition of suitable habitat in the Cumberland subregion to promote long-term viability and ecological connectivity?
Social	Has the Plan supported increased public access to green space to improve opportunities for recreation, wellbeing and social connection? Has the Plan supported increased stakeholder and community awareness and participation in relation to biodiversity conservation in the Cumberland subregion? Has the Plan promoted Aboriginal culture and knowledge in the Cumberland subregion and supported economic opportunities for Aboriginal people?

Table 2: Five-yearly evaluation of the effectiveness and efficiency of conservation actions, based on delivery of the outcomes

	Evaluation questions
Conservation program impact	To what extent have the outcomes been delivered? If there is an expected delay between the timing of intervention and the delivery of outcomes, explain why and estimate when the outcome is expected to be delivered. Has the Plan been effectively funded to deliver the proposed conservation program? Have the financial and non-financial benefits identified in the Plan's Benefits Realisation Register been realised?
External factors	Did external factors affect the outcomes? If so, please specify and describe the extent of the impact. Did any environmental changes or ecological processes occur outside the control of the Plan that might influence outcomes? Were there unexpected outcomes (good or bad)?
Conservation program design	Did the commitments, actions and targets lead to outcomes? Do the evaluation program's indicators require improvement to better measure change? Do the delivery criteria require improvements for more effective execution of the Plan? Is there information to suggest conservation program logic will become invalid in the future? Are the relationships in the conservation program logic linking actions to commitments to outcomes still valid? Are the assumptions in the conservation program logic still valid?
Governance	What adaptive management decisions have been made to ensure that the commitments of the Plan were fulfilled, and what information supported the decision? Do the governance arrangements require improvement to enable more effective adaptive management procedures? Do the governance arrangements require improvement to ensure accountability in delivering the Plan?
Efficiency	Was the conservation program delivered within the expected timeframe? Was the conservation program delivered within budget? Have delivery partners met obligations for actions, including reporting requirements? Have relationships with delivery partners been effectively managed? Have internal stakeholders worked collaboratively to deliver the Plan effectively and efficiently?

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The bark of a scribbly gum

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