Report on ACT Lowland Native Grassland Investigation

by Dr Maxine Cooper | Commissioner for Sustainability and the Environment |12 March 2009

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This has been a major investigation. I am grateful and wish to thank the project managers who coordinated the overall process and undertook the intense research that has guided my findings and recommendations. Ms Pamela Mathie, with her legal background, provided insight into how to strengthen some policies. As the initial project manager she designed the investigation process, which resulted in an open and thorough investigation. Mrs Narelle Sargent took over from Ms Mathie and managed the investigation to its completion. Mrs Sargent's background in natural resource management proved valuable in shaping recommendations that are progressive and practical. Ms Mathie and Mrs Sargent have been dedicated to ensuring all relevant information was canvassed and that the views of key experts and stakeholders were considered. Thank you Ms Mathie and Mrs Sargent.

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Executive summary and recommendations

On 15 November 2007 the Australian Capital Territory Minister for the Environment, Water and Climate Change, Jon Stanhope, pursuant to section 12(1) (b) of the *Commissioner for the Environment Act 1993*, directed that I, Dr Maxine Cooper,[1] as the Commissioner for Sustainability and the Environment, undertake an investigation into the Territory's lowland native grasslands.[2]

This investigation has considered 49 lowland native grassland sites in the ACT, on both National and Territory land. These sites are the subject of Australian and ACT Government legislation and have a number of land managers. Complex administrative arrangements exist including memoranda of understanding, licences, leases (including land management agreements) and Conservator's Directions.

Findings and recommendations relating to one site, the Belconnen Naval Transmission Station[3] (referred to as Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)) were made public in March 2008. Some recommendations have already been implemented. The report on this site is included as Appendix 1 to this report.

Once this report is given to the Minister, pursuant to section 22 of the *Commissioner for the Environment Act 1993*, the Minister must, within 15 sitting days after the day of receiving the report, present the report or recommendation to the Legislative Assembly.

Lowland native grassland comprises several types of grassland communities; of particular importance is Natural Temperate Grassland, which is one of the Territory's most threatened ecosystems.[4] Only 5% (1,000 hectares) of the estimated 20,000 hectares of Natural Temperate Grassland that existed in the ACT prior to European settlement remains. Nationally, less than 1% of this community remains.[5]

Within lowland native grassland sites, particularly those associated with the Natural Temperate Grassland, the following species can be found:

- Grassland Earless Dragon (endangered under Territory and Commonwealth legislation)
- Golden Sun Moth (endangered under Territory legislation and critically endangered under Commonwealth legislation)
- Striped Legless Lizard (vulnerable under Territory legislation and endangered under

[1] Dr Cooper was Executive Director, Arts, Heritage and Environment and in this role held the position of Conservator of Flora and Fauna and Chief Animal Welfare Authority. Dr Cooper has not been in this role for over three years. Dr Cooper is currently a member of the Australian Animal Welfare Strategy Advisory Committee.

[2] Lowland native grassland include Natural Temperate Grassland (which has been declared an endangered ecological community in the ACT and nationally) and native pasture derived from Natural Temperate Grassland as per *A Vision Splendid of the Grassy Plains Extended: ACT Lowland Native Grassland Conservation Strategy*, Action Plan No. 28, ACT Government, 2005 (hereafter known as Action Plan No. 28).

[3] *Report on Belconnen Naval Transmission Station (BNTS) Site as part of the Investigations into ACT Lowlands Grasslands*, 26 February 2008.

[4] Natural Temperate Grassland is listed as an endangered ecological community under Territory (*Nature Conservation Act 1980)* and Commonwealth (*Environment Protection and Biodiversity Conservation Act 1999)* legislation.

[5] Action Plan No. 28.

Commonwealth legislation)

- Perunga Grasshopper (vulnerable under Territory legislation)
- Ginninderra Peppercress (endangered under Territory legislation and vulnerable under Commonwealth legislation)
- Button Wrinklewort (endangered under Territory and Commonwealth legislation).[6]

The ACT is fortunate in being in a strong position to be able to advance the protection of lowland native grassland, in particular Natural Temperate Grassland communities and the species it supports, as:

- Significant areas of these communities are afforded protection by being in the Urban Parks and Recreation zone under the *Territory Plan 2008*.[7] An estimated 835 hectares (just under 40%) of the remaining lowland native grassland is in a reserve, therefore having the highest level of protection.
- Legislation and policies exist that afford protection.
- Community groups work on, and promote the need for protecting lowland native grassland.
- Exceptionally skilled native grassland experts are located in Canberra in universities, research institutions and government agencies, and within the community.
- The ACT and Australian governments, private organisations and corporations invest resources in protecting lowland native grassland.

While this is the case, most grassland sites are either in or near Canberra's urban areas, and are fragmented, with connectivity being limited and urban activities frequently adversely affecting them and their associated species. Their location presents land management challenges, which are complicated because of restrictions on actions due to their proximity to urban areas.

Protecting lowland native grassland from development is also a challenge as these areas, being generally flat to gently undulating with no trees, are often prime potential development sites. Much of Canberra's development is on lands that were once lowland native grassland.

Following are recommendations, which if supported, need to be implemented collaboratively by the ACT Government, and the Australian Government, by private agencies and by the community.

Recommendations 21 and 15 need to be given the highest priority and implemented as a matter of urgency, that is, immediately or at least within the next six months, if logistically possible. In the Executive Summary, these recommendations are presented first. The other recommendations are then presented in the order in which they appear in the report, namely:

- Legislation and policy (recommendations 1 to 5)
- Management arrangements (recommendations 6 to 18)

[6] Other threatened plant species are listed in Action Plan No. 28, Table 2.2, page 24.

[7] ACT Planning and Land Authority, Territory Plan March 2008.

- Management issues (recommendations 19 to 21
- Future land use and development (recommendations 22 to 27)
- Adaptive management (recommendations 28 and 29)
- Communication and community awareness (recommendations 30 to 32).

Urgent recommendations

Findings that informed Recommendation 21

Of the Territory's 49 lowland native grassland sites:[8]

- Twenty (40%) are in good condition.
- Twenty (40%) are approaching a critical threshold.[9]
- Ten (20%) are in a critical condition.

Lawson Commonwealth (BE08) site was assessed as two separate areas being Belconnen Naval Transmission Station (BE08(a) (the area behind the secure fence) and Lawson Commonwealth – East (BE08(b) (the area outside the secure fence). Hence the above summary totals 50 instead of 49.

There is an urgent need for land management actions to be undertaken to protect the 60% of the Territory's lowland native grassland sites that are currently in a critical condition or approaching this state. The threatening processes that have caused the demise of the grassland sites include weeds, inappropriate mowing regimes, overgrazing by stock, Eastern Grey Kangaroos[10] and rabbits. The prolonged drought has exacerbated the effect of these processes.

The over abundance of kangaroos[11] is a recent and highly significant threat that has changed the condition of many of the lowland native grassland sites, and likely to adversely affect other sites in the future. It is estimated that a sustainable kangaroo density is approximately one kangaroo per hectare. The most humane methods should be used to reduce kangaroo numbers to achieve this density. This is likely to be shooting. From an animal welfare perspective the most appropriate time to cull is between March and July to avoid the time of year when a high proportion of females are supporting 8- to 12-month-old juveniles. Sectors of the community are likely to find culling at anytime unacceptable. Their views are respected and their submissions to this investigation have been carefully considered; however, there is at present no practical alternative for removing large numbers of kangaroos. Given the limited time for undertaking a cull, the ACT and Australian

[8] Dr Ken Hodgkinson undertook a field assessment. Based on his work and from discussions with other experts, sites have been classified as good, approaching critical threshold, or being in a critical condition.

[9] Lawson Territory (BE07) site although approaching a critical threshold, is a site that is to be developed. Much of this site is highly degraded, with only small fragmented patches of Natural Temperate Grassland remaining. Accordingly, actions to restore its condition are not appropriate. It needs to be managed, however, so that it does not adversely affect Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)).

[10] Hereafter referred to as kangaroos.

[11] The 2007–08 State of the Environment report states that motor vehicle accidents involving kangaroos has increased by 38% (from 563 in 2005–06 to 777 in 2006–07). Rangers have advised that they now attend more than 1,000 roadside kangaroo incidents per year in Canberra. Researchers who undertook an analysis on kangaroos that were culled at Belconnen Naval Transmission Station (BE08(a)) in May 2008, report that the winter of 2008 may have provided a serious threat to the survival of the kangaroos with low marrow fat, had the cull been postponed.

Government departments, who are the relevant land managers, were informed several months ago that there would be a recommendation in this report regarding the need to remove kangaroos from some sites as a matter of urgency. Addressing the over population of kangaroos needs to be given a very high priority.

A Kangaroo Management Plan for the ACT is currently in preparation and will be the subject of consultation.[12] While this is the case, removal of kangaroos should not be delayed, pending adoption of this plan. Existing polices and procedures should be used to guide needed field actions. The Kangaroo Management Plan should, however, be progressed as quickly as possible to guide field and other actions in 2010 and beyond.

Recommendation 21: Improve the ecological condition of sites that are in a critical condition or approaching this state, by reducing current threatening processes of weed invasion, inappropriate mowing and overgrazing by stock, rabbits and kangaroos as a matter of urgency, specifically:

In Majura Valley:

- Grazing pressure should be reduced by:
    - — Reducing the number of kangaroos on 'Malcolm Vale' (MA04) and Majura West (MA06). There is also a need to continue to manage kangaroos on the Majura Training Area (MA01) while not detrimentally affecting adjacent native woodland.
    - — Strategically managing (and in the short-term temporarily removing) stock and controlling rabbits on Majura West (MA06).
- Weed management controls should be enhanced on Majura Training Area (MA01) and 'Malcolm Vale' (MA04).

(Strategically located temporary kangaroo management fencing should be considered for placement around Campbell Park (MA05) and possibly parts of Majura West (MA06) if the stock and kangaroo densities in this general area are not reduced within the next six months. This is a temporary measure to protect the Grassland Earless Dragon habitat.)

In Jerrabomberra Valley:

- Grazing pressure should be reduced by:
    - — Reducing the number of kangaroos on Jerrabomberra East Reserve (JE05).
    - — Strategically managing (and in the short-term temporarily removing) stock and controlling rabbits on 'Cookanalla' (JE08).
- Weed management controls should be enhanced on Harman Bonshaw South (JE06) and Harman Bonshaw North (JE07).

In Gungahlin:

- Grazing pressure should be reduced on Crace Nature Reserve (GU03) by:
    - — Reducing the number of kangaroos.

[12] Pers. comm., Mr Russell Watkinson, 6 January 2009.

— Strategically managing (and in the short-term temporarily removing) stock and controlling rabbits.

- Weed management controls should be enhanced on Crace Nature Reserve (GU03), at Wells Station Road (GU07) and Nicholls (GU08).

In Belconnen:

- Grazing pressure should be reduced by:
  - — Strategically managing (and in the short-term temporarily removing) stock and reducing the number of kangaroos and controlling rabbits on Dunlop Nature Reserve (BE02) and 'Jarramlee' (BE03).
  - — Reducing the number of kangaroos on Ginninderra Experimental Station (BE01).
  - — Reducing the number of kangaroos and controlling rabbits on Caswell Drive (BE10). Given the size and location of this site, it may be necessary to reduce the number of kangaroos on land in the vicinity of this site rather than concentrating only on this site
- Weed management controls should be enhanced on Umbagong Park North (BE04(b)), and in the areas of Lawson Territory (BE07) that may affect the Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)) site.

In Canberra Central:

- Weed management controls should be enhanced on York Park, Barton (CC05); Yarramundi Reach (CC06); Lady Denman Drive, Yarralumla (CC07); Dudley Street, Yarralumla (CC08); and Guilfoyle Street, Yarralumla (CC09).
- Mowing regimes should be revised to enhance grassland conservation for Lady Denman Drive, Yarralumla (CC07); Dudley Street, Yarralumla (CC08); Guilfoyle Street, Yarralumla (CC09); Novar Street, Yarralumla (CC10); and Black Street, Yarralumla (CC11).

Findings that informed Recommendation 15

The 'Cookanalla' (JE08) site, a rural lease, has reached its current degraded state without action being taken by the relevant government department to enforce compliance with the conditions in the Land Management Agreement, which is part of its rural lease (*see* Section 3 Management arrangements).

Recommendation 15: Immediately enforce the provisions and conditions in the land management agreement, which is a part of the rural lease for 'Cookanalla' (JE08).

Other recommendations

Legislation and policy

Findings that informed Recommendation 1

The Territory's planning and nature conservation legislation needs to be streamlined. Some land management matters, such as management plans, are covered in planning legislation; these may be better placed under nature conservation legislation.

Recommendation 1: Streamline ACT Government planning and nature conservation legislation to ensure all land management matters are covered by the *Nature Conservation Act 1980* (ACT) (currently under review).

Findings that informed Recommendation 2

This investigation found limitations in the level of protection that could be secured for Natural Temperate Grassland under the *Environmental Protection and Biodiversity Conservation Act 1991* (Cwlth). Submissions were invited as part of the Commonwealth's review of this legislation. The Commissioner's Office made a submission, which recommended, among many things, that this Act should:

- facilitate consideration of cumulative impacts of proposed developments, on listed and non-listed communities and species, with respect to referrals to the department for assessment
- be triggered by 'no action', that is, not undertaking needed land management actions
- identify the best option for protecting a listed community or species rather than only assessing the presented option
- strongly foster compliance and enforcement activities.

Recommendation 2: The *Environmental Protection and Biodiversity Conservation Act 1991* (Cwlth) should be strengthened so sites and species are more effectively protected and managed.

Findings that informed Recommendation 3

The ACT is unique in having a Conservator of Flora and Fauna whose powers can be used to afford extra protection to specific sites or species. The Conservator's role and functions are broad and it is possible for the Conservator of Flora and Fauna to be the same officer who is responsible for undertaking land management functions on Territory Lands. The legislation that creates the Conservator of Flora and Fauna, the *Nature Conservation Act 1980* (ACT), is currently under review. It is understood that as part of this review issues associated with the Conservator's role and functions will be part of a public discussion paper.

Given that 60% of the Territory's lowland native grassland sites need urgent land management action, it is important that the Conservator have powers to direct that appropriate land management actions be undertaken.

Recommendation 3: As part of the current review of the *Nature Conservation Act 1980* (ACT), ensure that lowland native grassland, in particular Natural Temperate Grassland ecosystems are protected by the Conservator of Flora and Fauna having powers to direct, when necessary, that land management actions be undertaken.

Findings that informed Recommendation 4

To help determine appropriate long-term land use for some lowland native grassland sites, the heritage status of lowland native grassland sites that have been nominated for heritage listing needs to be resolved. The sites nominated for inclusion on the ACT Heritage List (those also nominated on the *Commonwealth Heritage List* are listed in *italics*):

- Majura Training Area (MA01), Air Services Beacon (MA02), Canberra International Airport (MA03), 'Malcolm Vale' (MA04), *Campbell Park* (MA05), *Majura West* (MA06), '*Callum Brae*' (JE02), *Jerrabomberra West Reserve* (JE03), *Jerrabomberra East Reserve* (JE05), *Harmon Bonshaw South* (JE06), Harmon Bonshaw North (JE07), Lawson Territory (BE07), Lawson Commonwealth (BE08(a) and (b)), Kama South (BE12), Black Street, Yarralumla (CC11).

Recommendation 4: Resolve the heritage status of lowland native grassland sites, in a timely manner, to assist long-term planning.

Findings that informed Recommendation 5

Since the gazettal of the *Nature Conservation Act 1980* (ACT), some innovative approaches for managing and strategically protecting ecosystems have emerged. While it is beyond the scope of this investigation to examine these, they should be considered as part of the review of the *Nature Conservation Act 1980* (ACT).

Recommendation 5: As part of the current review of the *Nature Conservation Act 1980* (ACT), ensure that lowland native grassland, in particular Natural Temperate Grassland, ecosystems are protected by innovative mechanisms such as conservation leases, voluntary agreements, bio-banking and offsets are investigated and progressed.

Management arrangements

Findings that informed Recommendation 6

Significant areas of lowland native grassland are located on lands held by Australian Government departments or private agencies. One means of fostering communication and integration of activities between departments and agencies is through development and implementation of memorandum of understanding. Significant effort went into developing memoranda of understanding in 1998; however, it appears implementation was limited. A reason for this may have been lack of an across–department / agency coordination group. Given the challenges in managing lowland native grassland sites that all departments and agencies currently confront, it seems timely to update existing memoranda of understanding and focus on their implementation.

The ACT Government currently has memoranda of understanding with:

- **Department of Defence** for Majura Training Area (MA01), Malcolm Vale (MA04), Campbell Park (MA05), Harmon-Bonshaw South (JE06), Harmon-Bonshaw North (JE07), part of Crace Nature Reserve (GU03), Lawson Commonwealth (BE08(a) and (b))
- **National Capital Authority** for Yarramundi Reach (CC06), Lady Denman Drive (CC07) (part National Land), and Guilfoyle Street, Yarralumla (CC09)
- **CSIRO** for CSIRO Headquarters, Campbell (CC01) and Ginninderra Experimental Station (BE01).

The Australian Government Department of the Environment, Water, Heritage and the Arts is a signatory to each.

In updating memoranda of understanding with the National Capital Authority, to ensure requirements under the National Capital Plan are met, those grassland sites on Territory Land that are Designated Areas – Kaleen East Paddocks (BE09); Caswell Drive (BE10);

Glenloch Interchange (BE11); Constitution Avenue, Reid (CC02); St John's Church, Reid (CC03); Australian Centre for Christianity and Culture (CC04); Lady Denman Drive, Yarralumla (CC07); Dudley Street, Yarralumla (CC08); Novar Street, Yarralumla (CC10); and Black Street, Yarralumla (CC11) – should be included.

Recommendation 6: Existing memoranda of understanding between the ACT Government and Department of Defence, the National Capital Authority and CSIRO, with the Department of Environment, Water, Heritage and the Arts being a signatory, should be updated and implemented.

Findings that informed Recommendation 7

There is also an opportunity to development memoranda of understanding between the ACT Government and the Department of Finance for York Park, Barton (CC05); Air Services Australia for Air Services Beacon (MA02); and the Canberra Airport Group for Canberra International Airport (MA03). The Department of Environment, Water, Heritage and the Arts needs to be a signatory to each of these memoranda of understanding.

Recommendation 7: Develop memoranda of understanding between the ACT Government and the Department of Finance, Air Services Australia and the Canberra Airport Group, with the Department of Environment, Water, Heritage and the Arts being a signatory.

Findings that informed Recommendation 8

A coordination and implementation group needs to be established to ensure implementation of memorandum of understanding.

Recommendation 8: Establish a memorandum of understanding coordination and implementation group with an ACT Government agency being the lead agent.

Findings that informed Recommendation 9

Management plans need to be amended to reflect recent changes and afford greater protection to lowland native grassland.

Recommendation 9: Amend the *Canberra Nature Park Management Plan* (1999) to incorporate:

- Action Plan No. 28, *ACT Lowland Native Grassland Conservation Strategy* (2005)
- the new nature reserves of 'Callum Brae' (part JE02), Jerrabomberra West Reserve (JE03), Jerrabomberra East Reserve (JE05).

Findings that informed Recommendation 10

While several policy and planning documents pertaining to lowland native grassland exist, not all sites are subject to annual site operation plans, or their equivalent, to guide field actions. These plans are important in assisting staff, particularly in large organisations where staff rotations may occur.

Parks Conservation and Lands (Department of Territory and Municipal Services) has developed annual action spreadsheets and management specifications for some sites, both of which are essentially annual site operation plans. These should be used as a model in developing plans for all sites. A cooperative approach between land managers, lessees and

Australian Government and Territory agencies is needed for these to be uniformly adopted and implemented.

Recommendation 10: Develop and implement annual site operation plans for all lowland native grassland sites.

Findings that informed Recommendation 11

An area of Natural Temperate Grassland (Lake Ginninderra (BE06) site) adjoining Lake Ginninderra could be afforded a higher level of protection through being managed under a Plan of Management.

Recommendation 11: Amend the Belconnen Urban Parks, Sportsgrounds and Lake Ginninderra Plan of Management to include the lowland native grassland site of Lake Ginninderra (BE06).

Findings that informed Recommendation 12

From discussions with staff in relevant agencies it seems that the time involved in administering agistment licences could be reduced if these were standardised, including termination dates and if one government agency only was the government signatory to these agreements.

Recommendation 12: Simplify administration of agistment licences covering lowland native grassland sites through standardising their conditions, including termination dates; and have one government agency signatory to an agistment lease.

Findings that informed Recommendations 13

Confusion between some Department of Territory and Municipal Services and ACT Planning and Land Authority staff is apparent over who is accountable for administering Land Management Agreements that support rural leases. The process for administering leases (including land management agreements) is complex and involves both Territory and Municipal Services and ACT Planning and Land Authority staff. This complexity may have led to confusion regarding accountability for enforcement of the conditions in the Land Management Agreement for 'Cookanalla' (*see* Recommendation 15). Given the role of Parks Conservation and Lands (Department of Territory and Municipal Services) it seems appropriate for them to be fully responsible for administering land management agreements.

Recommendation 13: Ensure rural lease processes (including those for land management agreements) are simplified and responsibilities are clarified.

Findings that informed Recommendations 14

Parts of Crace Nature Reserve (GU03) and Caswell Drive (BE10) have rural leases that are managed under land management agreements. Given that these land management agreements have not been reviewed within the required five-year period and these sites are in a critical condition, a review of the conditions in the land management agreements is needed. Once this is done, compliance with the conditions in the land management agreement should be monitored to ensure their implementation.

Recommendation 14: Review the land management agreements covering Crace Nature Reserve (GU03) and Caswell Drive (BE10).

Findings that informed Recommendation 16

Conditions in land management agreements (attached to rural leases) are potentially a powerful mechanism for protecting lowland native grassland areas on leased rural land. However, for their benefit to be realised the conditions must be implemented. Accordingly, the government department responsible for administrating land management agreements needs to monitor compliance and take enforcement action if needed. In this investigation no information was available that indicated that any action had been taken to monitor compliance with, or enforce conditions in the land management agreement for 'Cookanalla' (JE08), a site that needs land management actions to restore its ecological conditions.

Recommendation 16: Foster a strong culture of compliance, monitoring and enforcement within the government department responsible for administering land management agreements.

Findings that informed Recommendations 17

Land management agreements need to be monitored and assessed in order to ensure the required on-the-ground actions are achieving the desired ecological results. There was no evidence of a formal monitoring, assessment or auditing process being in place. Furthermore, information from such a process could be used to help the ACT Government's Flora and Fauna Committee advise on policy issues and monitor implementation of the ACT Government's, 2005 *A Vision Splendid of the Grassy Plains Extended: ACT Lowland Native Grassland Conservation Strategy*, Action Plan No. 28.

Recommendation 17: Establish a formal monitoring, assessment and auditing process aimed at ensuring conditions in land management agreements achieve the desired ecological results.

Findings that informed Recommendation 18

Grazing is an important land management tool currently used to control grassland biomass. However, if this is used inappropriately it can adversely affect the lowland native grassland ecology. Grazing should, therefore, be undertaken as part of the conservation management strategy within an adaptive management process to protect lowland native grassland sites.

Recommendation 18: Permit grazing under rural leases and licences, on lowland native grassland sites if it is part of a long-term conservation management strategy.

Management issues

Findings that Informed Recommendation 19

While not researched fully, it is generally believed that fire enhances grassland diversity to a greater extent than grazing or mowing. Compared with fire, both grazing and mowing are more likely to introduce weeds into a site, or spread them within a site. However, ecological burns are not undertaken as a routine part of managing grasslands within the ACT. As the use of fire is not fully researched, and as lowland native grassland areas are primarily in or near Canberra's urban areas resulting in logistical challenges for undertaking burns, it is

recommended that some experimental burns be undertaken to inform decisions about a wider use of fire.

Potential sites for consideration for an ecological burn program are: Air Services Beacon (MA02); Constitution Avenue, Reid (CC02); St John's Church, Reid (CC03); Australian Centre for Christianity and Culture, Barton (CC04); Yarramundi Reach (CC06); Guilfoyle Street, Yarralumla (CC09); Umbagong Park South, Florey (BE04a); Umbagong Park North, Florey (BE04b); Lawson Commonwealth – East (BE08(b)); Evatt Footbridge; Isabella Pond, Monash (TU01); and Mitchell (GU05).

Recommendation 19: Undertake experimental ecological burns on selected sites to determine the appropriateness of a wider application for managing lowland native grassland sites in the ACT.

Findings that informed Recommendation 20

Two of the most threatening processes that usually affect lowland native grassland sites in the ACT are insufficient weed control and inappropriate mowing regimes (*see* Appendix 10).

Recommendation 20: Give priority to weed management and implementing appropriate mowing practices as part of routine work programs.

Future land use and development

Findings that informed Recommendation 22

Lowland native grassland sites, being located in, or close to, Canberra's urban areas and relatively easy to develop, are frequently considered for their development potential. Often when making development decisions these sites are considered in isolation. A strategic approach across the ACT is needed to give the highest level of protection to those lowland native grassland sites with the highest ecological values, provide connectivity between these sites, and foster appropriate development. This approach needs to involve identification of the long-term land uses for all lowland native grassland sites, and use of offsets to allow development of others. Given that there may be difficulties in always having a 'like for like' replacement, offsets that involve the use of offset restoration sites[13], funding research or restoration programs should be considered.

The ACT and Australian governments have enacted legislation that facilitates protection of lowland native grassland areas and species, particularly those listed as threatened; and both these Governments own lands that have significant lowland native grassland areas. Therefore, both governments need to agree on a strategic approach to protect these grassland sites for this to be effectively implemented.

Recommendation 22: The ACT Government and the Australian Government commit to taking a strategic approach to protecting lowland native grassland, in particular Natural Temperate Grassland, threatened grassland species and fostering sustainable development by:

- Giving priority to protecting all Category 1: Core Conservation Sites that contain

[13] Offset restoration sites are strategically selected areas for undertaking on-the-ground field restoration activities. It will not necessarily be ecologically beneficial to have an offset within the same locality as the site that is developed.

Natural Temperate Grassland and key threatened grassland species, and ensuring that these areas are not affected by development proposals.

- Placing in a reserve, where appropriate, Natural Temperate Grassland sites in Category 1: Core Conservation Sites. If this is not possible, these grassland areas and associated species should be conserved and managed as if they were in a reserve.
- Integrating conservation values with development considerations for all Category 2: Complementary Conservation Sites and Category 3: Landscape and Urban Sites and ensuring connectivity is retained or enhanced.
- Developing an offset policy (that includes identification of offset restoration sites) for loss of lowland native grassland, particularly Natural Temperate Grassland, due to development.

Findings that informed Recommendation 23

Within the ACT four main locations – Majura Valley, Gungahlin, Belconnen, Jerrambomberra Valley – still have large, intact lowland native grassland sites. The ACT Government has strategically committed to reserve lands it owns that have Natural Temperate Grassland and are Category 1: Core Conservation Sites. The largest sites in Gungahlin and Jerrabomberra Valley are already in reserve. It has also negotiated with the Commonwealth for a Core Conservation Site, that is, the Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)), to be planned as a reserve. Majura Valley's large, intact lowland native grassland area, which consists of a number of sites under the control of various government agencies, does not have long-term planning protection; it is not in a reserve and there is no commitment for this to occur.

Given the significance of the Majura Valley grassland, arguably one of the largest areas of Natural Temperate Grassland remaining in southeast Australia, the presence of five threatened species including the Grassland Earless Dragon, it is strongly recommended that a commitment be made to create a reserve in this locality. This proposed reserve should be defined in the near future and include part of the Majura Training Area (MA01), and potentially parts of Air Services Beacon (MA02) and 'Malcolm Vale' (MA04). Connectivity with the Canberra International Airport (MA03) will be particularly important in protecting the Grassland Earless Dragon. As current land uses on these sites, if managed effectively, are compatible with sustaining the ecological values of the grassland, areas nominated for inclusion in the proposed reserve could continue being used for their current purposes and managed by the existing land managers.

While defining the site of the proposed Majura Valley reserve would constrain future development options, for example, the potential Canberra International Airport northern link road and the potential east-west Kowen road, it would provide a more certain context for potential developments. It would also ensure that the Natural Temperate Grassland, the Grassland Earless Dragon and other threatened species are not adversely affected through incremental developments, as would be the case if the potential Canberra International Airport northern link road and the potential east-west Kowen road were to be progressed according to existing concept plans.

The lands for the proposed reserve could be the subject of a formal conservation agreement between the ACT and Australian governments.

Recommendation 23: Plan a Majura Valley Reserve to protect Natural Temperate Grassland and its supporting species, particularly the Grassland Earless Dragon, by defining the boundaries of this proposed reserve in the near future.

Findings that informed Recommendation 24

Campbell Park (MA05) in the Majura Valley is a small parcel of Commonwealth land in good condition that contains Natural Temperate Grassland, has a population of the Grassland Earless Dragon and is classified as a Core Conservation Site. It adjoins Majura West (MA06), Territory Land, which is a large area that contains the endangered Grassland Earless Dragon. Majura West (MA06) is an important ecotone (where the two ecosystems of lowland native grassland and Yellow–Box Red Gum Grassy Woodland merge), is the only Category 1: Core Conservation Site that does not contain Natural Temperate Grassland, and lends itself to being an offset restoration site for actions to be implemented to improve the habitat of the Grassland Earless Dragon.

Majura West (MA06) is contiguous with Campbell Park (MA05) and Mount Ainslie Reserve. From information considered in this investigation, it appears that potential developments in the Majura Valley have been planned to avoid these areas. Given this and their ecological value it seems appropriate for all or parts of these sites to be included in Mount Ainslie Reserve.

Recommendation 24: Expand the Mount Ainslie Reserve to include areas of lowland native grassland in Campbell Park (MA05) and Majura West (MA06).

Findings that informed Recommendation 25

Caswell Drive (BE10) and Glenloch Interchange (BE11) are Territory Lands that contain small areas of Natural Temperate Grassland and have been classified as Category 1: Core Conservation Sites. These are currently managed under a rural lease and as a roadside. Given their ecological value, amalgamation with nearby reserves would offer long-term protection.

Recommendation 25: Expand Aranda Bushland and Black Mountain Reserve by including areas of lowland native grassland in Caswell Drive (BE10) and Glenloch Interchange (BE11).

Findings that informed Recommendation 26

There is a need to clarify the long-term land use for some lowland native grassland sites. This investigation found that the condition of some sites suggests that their ecological value may have declined to such a degree that they may need to be reassessed. These sites need to be subjected to an ecological assessed in the appropriate season/s.

In determining the long-term land use of lowland native grassland sites it is important to consider how best to strategically protect lowland native grassland, particularly Natural Temperate Grassland and threatened species, and also develop Canberra. Retaining some small areas of grassland may be appropriate in some circumstances, but not in others. Where retention on a site is inappropriate an offset, for example, undertaking restoration activities on another grassland site or funding research, should be required. It is likely that in many circumstances there will be benefit in having offsets undertaken in a strategic manner by nominating specific offset restoration sites. Recommendations 5 and 22 promote the

development of an offset policy (that includes identification of offset restoration sites). Possible offset sites include:

- Majura West (MA06) to enhance its habitat to better support the Grassland Earless Dragon
- Yarramundi Reach (CC06), Caswell Drive (BE10) and Glenloch Interchange (BE11) to enhance the overall grassland quality.

Depending on the land use for 'Cookanulla' (JE08), this site may also be appropriate as an offset site.

Recommendation 26: Define the long-term land use for lowland native grassland sites, while strategically protecting lowland native grassland, particularly Natural Temperate Grassland, and progressing appropriate developments, specifically:

- 'Callum Brae' (part JE02) – excluding the land swap site. The areas of ecological connectivity need to be defined. Areas of ecological connectivity could be managed under a conservation lease or, depending on location, amalgamated with the adjoining rural lease. If development occurs, an offset should be required.
- 'Cookanalla' (JE08) – a Grassland Earless Dragon survey is needed in conjunction with a survey to identify habitat that would support this species. Given the condition of the site, it may be appropriate to undertake surveys when the site has recovered, at least to some degree, from its current threatening processes. This site appears to lend itself to a land use that integrates conservation values with development. If areas of grassland are developed an offset should be required.
- AMTECH (JE09) – reassess the site's ecological values as these may have changed. If this site no longer meets criteria for its current classification as a Category 2: Complementary Conservation Site and changes to Category 3: Landscape and Urban Sites, its development potential could be realised. If areas of grassland are developed an offset should be required.
- Kaleen East Paddocks (BE09) – reassess the site's ecological values, as they were not obvious at the time of inspection. If these values still exist and development were to occur, given the likelihood that there is only a small area of Natural Temperate Grassland remaining, this may be able to be integrated with any future developments.
- Lawson Commonwealth – East (BE08(b)) – Given the overall context of this site it appears to lend itself to a land use that integrates conservation values with development. An offset should be required if areas of grassland are developed.
- Constitution Avenue, Reid (CC02) – If a decision is made to develop the Natural Temperate Grassland area, an offset should be required.

Findings that informed Recommendation 27

During the investigation, the Commissioner's Office found it difficult to identify the location of lowland native grassland sites relative to planning zones that guide land use. To help the community and developers gain information on grassland sites relative to planning zones it is recommended that a map of the location of lowland native grassland sites relative to planning zones be published.

Recommendation 27: Publish a map that shows the location of lowland native grassland sites relative to planning zones. This should be readily available through the ACT Planning and Land Authority and the Department of Territory and Municipal Services.

Adaptive management

Findings that informed Recommendation 28

Only 40% of the Territory's lowland native grassland sites are in good condition. This percentage may have been higher if an adaptive management approach had been used to manage all sites. An adaptive management approach is designed to improve environmental management by learning from results. It uses management actions as the primary tool for learning about the system being managed. An adaptive management approach focuses on achieving field results through, among other things, regular site inspections and monitoring (this could include photographic recordings), using research findings to inform management practices, undertaking controlled and monitored experiments, such as, reintroducing targeted species (plants and animals).

An adaptive management approach relies on regular site inspections and routine monitoring, something that was not being undertaken for many of the Territory's sites. Without regular site inspections and monitoring, threatening processes can go undetected until damage becomes obvious, at which stage the effort and resources needed to restore a site may be significant.

Recommendation 28: Use adaptive management to guide land management so that sites in good condition (40%) are maintained, and those in a critical condition (20%) or approaching a critical condition (40%) are restored.

Findings that informed Recommendation 29

The North Belconnen Landcare Group has nominated an area near the Evatt Footbridge as a lowland native grassland site. This site needs to be assessed before it is considered for designation as lowland native grassland.

During the investigation it was found that the ecological values on some sites may have changed and therefore these sites need to be reassessed to determine their appropriate classification. These sites are Wells Station Road (GU07); Nicholls (GU08); Novar Street, Yarralumla (CC10); Belconnen Pony Club (GU06); Lawson Commonwealth – East (BE08(b)); and Mitchell (GU05).

Recommendation 29: Assess the ecological values of Evatt Footbridge; Wells Station Road (GU07); Nicholls (GU08); Novar Street, Yarralumla (CC10); Belconnen Pony Club (GU06),; Lawson Commonwealth – East (BE08(b)); and Mitchell (GU05).

Communication and community awareness

Findings that informed Recommendation 30

Many stakeholders, researchers and experts were concerned about not having the opportunity to meet with each other and land managers, as a group, to share information. This could be overcome by conducting an annual community and stakeholder forum to,

among other things coordinate research, monitoring and data collection, and raise awareness. The Commissioner's Office would be willing to convene the initial forum.

Recommendation 30: Conduct an annual community and stakeholder lowland native grassland forum to, among other things, coordinate research, monitoring and data collection, and raise awareness.

Findings that informed Recommendation 31

There is a wealth of information and expertise in the Capital region on lowland native grassland, but it is dispersed and therefore difficult to access. This difficulty could be addressed by establishing an accessible central register of information on lowland native grassland that includes current research and studies. This could be made available through a website.

Recommendation 31: Establish an accessible central register of information and expertise on lowland native grassland.

Findings that informed Recommendation 32

While in some spheres, community awareness of the importance of the ecological value of lowland native grassland and the species it supports has increased significantly over the past 15 years, awareness within the general public still appears limited. Awareness could be increased, for example, by:

- placing signage with interpretative material at key sites, such as Canberra International Airport (MA03); St John's Church, Reid (CC03); Australian Centre for Christianity and Culture, Barton (CC04); 'Callum Brae' (JE02); Jerrabomberra West Reserve (JE03); Jerrabomberra East Reserve (JE05); Mulanggari Nature Reserve (GU01); Gungaderra Nature Reserve (GU02); Crace Nature Reserve (GU03); North Mitchell (GU04); and Dunlop Nature Reserve (BE02)
- promoting sites as part of the Territory's Tracks and Trials Heritage Interpretative Tour
- encouraging use of lowland native grassland in restoration and rehabilitation projects following development activities such as new suburbs and road construction
- encouraging use of native grasslands to replace lawns and gardens in private and public places, which could lead to lower ongoing maintenance costs and reduced water use
- adopting a patron for Natural Temperate Grassland and endangered grassland species.

Recommendation 32: Increase community awareness of the importance of lowland native grassland, in particular Natural Temperate Grassland and the endangered grassland species.

Specific recommendations for Belconnen Naval Transmission Station (BE08(a)) site

Findings and recommendations for Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)) site were made public in March 2008. Some recommendations have been progressed (*see* Section 1.4 of this report) the government is yet to formally respond to these recommendations.

1 Introduction

1.1 Terms of reference

On 15 November 2007 the then Australian Capital Territory Minister for the Environment, Water and Climate Change, Jon Stanhope, pursuant to section 12(1) (b) of the *Commissioner for the Environment Act 1993*, directed that I, as the Commissioner for Sustainability and the Environment, undertake an investigation into the lowland native grassland in the ACT, and specified the Terms of Reference (*see* box).

TERMS OF REFERENCE FOR THE INVESTIGATION

The ACT Government has prepared a number of significant strategies for the conservation of grasslands and woodland. The Lowland Native Grassland Conservation Strategy and the Lowland Woodland Conservation Strategy along with the Aquatic Species and Riparian Zone Conservation Strategy, provide a strong framework for planning and management of the key threatened ecological communities in the ACT and species that are dependent upon them.

In recent months the ACT Government has become extremely concerned about the deterioration of some of our significant lowland native grasslands, particularly at Majura, Belconnen, Jerrabomberra and Gungahlin.

An inquiry into the situation is required under the following Terms of Reference:

(1) Review existing management arrangements, and if necessary, identify comprehensive conservation management principles and immediate actions to ensure the protection and long-term sustainability of native lowland grasslands and their vulnerable ecosystems.

(2) Identify the causes of the deterioration of lowland native grasslands. In doing this, the impact of eastern grey kangaroos, both in the long and short term, is to be explicitly addressed.

(3) Identify any impediments to implementing short and long-term management practice for conservation of lowland grasslands within the ACT. In doing this, identify any deficiencies (including development controls, data collection, monitoring and reporting programs), which need to be remedied to further protect native lowland grasslands, their vulnerable ecosystems and associated fauna adequately.

(4) Identify ways for ensuring effective communication with stakeholders, whose actions potentially, indirectly or directly affect, threatened grasslands.

(5) Determine whether any policy / legislative changes are needed for the protection of threatened lowland native grasslands.

The Commissioner is to consult with all relevant experts and key stakeholders, including the Department of Territory and Municipal Services, to canvas measures needed to ensure the long term sustainability of native lowland grasslands.

Commissioner's comment: Following release of the above terms of reference some stakeholders sought clarity regarding the scope of the inquiry / investigation, in particular the inclusion of the Grassland Earless Dragon, the Striped Legless Lizard and the Golden Sun Moth. I was advised by the Minister, letter dated 29 November, that the investigation of lowland native grasslands should include their associated threatened communities and species, as well as threats to, and identification of measures for protecting these, and other species are an inherent part of the Terms of Reference. Accordingly the specific species mentioned above are included.

This investigation has followed the Terms of Reference and these have been addressed throughout this report.

1.2 Lowland native grassland

Natural Temperate Grassland is one of Australia's most threatened ecosystems.[14] It is estimated that 20,000 hectares of Natural Temperate Grassland occurred in the ACT before European settlement. Approximately 5% (1,000 hectares) of the estimated original area of 20,000 hectares of grassland remains in the ACT and nationally, less than 1% of this community remains.[15] Currently in the ACT, 49 lowland native grassland sites[16] totalling approximately 2,200 hectares still exist; 43 of these sites contain approximately 1,000 hectares of Natural Temperate Grassland. Table 1 presents the ecological characteristics of the lowland native grassland sites, the subject of this investigation, and Appendix 3 shows the distribution of lowland native grassland sites in the ACT.

The temperate grassland (and woodlands areas) were the home of Aboriginal people, whose activities helped to shape the flora and fauna communities found by the first Europeans.[17] Since European settlement, the Natural Temperate Grassland has been modified by agricultural use, urbanisation and infrastructure development. As a result, the Natural Temperate Grassland community in the ACT now consists mainly of highly fragmented and isolated small patches (such as Guilfoyle Street, Yarralumla (CC09); Wells Station Road (GU07); and Tennant Street, Fyshwick (JE10), many of which are less than 1 hectare), with only 11 (23%) sites being greater than 100 hectares: Majura Training Area (MA01), Canberra International Airport (MA03), Jerrabomberra West Reserve (JE03), Harman Bonshaw North (JE07), Gungaderra Nature Reserve (GU02), Crace Nature Reserve (GU03), and Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)).[18]

Some areas that once supported the Natural Temperate Grassland ecosystem have been degraded to such an extent that they no longer represent this ecological community. Typically such sites contain or are dominated by one or more native grasses, but few other native species associated with natural grasslands remain. They are considered to be so modified that conservation management, unless very intense and significant, is unlikely to result in an increase in native diversity. Such sites are termed 'native pasture', and while botanically they do not constitute the community, some sites still retain populations of threatened species. In such cases, these sites are significant, but primarily as habitat for threatened species. Together, Natural Temperate Grassland and native pasture comprise the lowland native grassland of the ACT that is the subject of this investigation.

Four threatened fauna species and two flora species, all declared threatened (endangered or vulnerable) under the *Nature Conservation Act 1980* (ACT), occur within lowland native grassland in the ACT. The **endangered species** are the Grassland Earless Dragon (*Tympanocryptis pinguicolla*), the Golden Sun Moth (*Synemon plana*), the Button Wrinklewort (*Rutidosis leptorrhynchoides*), and the Ginninderra Peppercress (*Lepidium ginninderrense*). The **vulnerable species** are the Striped Legless Lizard (*Delma impar*) and the Perunga

[14] Action Plan No. 28.

[15] Action Plan No. 28.

[16] The sites in this report are the same as those in Action Plan No. 28, except for the inclusion of Kama South (BE12) and Evatt Footbridge. Lowland native grassland are defined as the areas that have separate land uses or ownership, or are separated by a major road or development, or by a significant other vegetation (native or exotic). Some sites are adjacent to each other, forming larger grassland units. Two of the very large sites have been considered in two sections due to the change in vegetation characteristics. These are Lawson Commonwealth (BE08) and Umbagong Park, Florey (BE04).

[17] Action Plan No. 28.

[18] Action Plan No. 28.

Grasshopper (*Perunga ochracea*). Table 1 lists the lowland native grassland sites that contain these threatened species.

Many other plant and animal species are found only in native grasslands and are wholly dependent on these remnant patches for survival. These species have become threatened as a direct consequence of the loss, degradation and fragmentation of native grassland. The populations of threatened species within these small and isolated patches are highly vulnerable to extinction. Compounding their vulnerability, such small populations are inherently more fragile than large populations, so any further disturbance or factors that lead to less favourable conditions for these species are likely to increase the risk of extinction.[19]

Under the *Nature Conservation Act 1980* (ACT), the Minister for the Environment, on the recommendation of the Flora and Fauna Committee, has declared that the Natural Temperate Grassland is an endangered community. Natural Temperate Grassland is also listed as an endangered ecological community under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).

Natural Temperate Grassland is a special ecological community, with less than 5% remaining in the ACT in sites generally less than 100 hectares. These grasslands, together with other sites that support threatened grassland species, require high conservation priority. The conservation of some of the remaining species of the lowland native grassland will need to be given exceptional priority if these threatened species are not to follow others which have previously disappeared (such as, brolgas and bettongs). The remaining fragments of Natural Temperate Grassland deserve special conservation protection.[20]

Action Plan No. 28 assesses the lowland native grassland sites on the basis of their conservation value and classifies each site according to its conservation significance, namely:

- **Category 1**: Core Conservation Sites – sites in this category meet the following criteria:
  - high botanical significance rating, or
  - key threatened species habitat, or
  - large sites (more than 100 hectares) with a botanical significance rating of 3.
- **Category 2**: Complementary Conservation Sites – sites in this category meet the following criteria:
  - moderate botanical significance rating, or
  - threatened species habitat, or
  - medium area sites (10 to 100 hectares) with a botanical significance rating of 4.
- **Category 3**: Landscape and Urban Sites – sites in this category meet the following criteria:
  - low to very low botanical significance rating; and small to very small area (less than 10 hectares); and

[19] Report from Parks Conservation and Lands to the ACT Commissioner for Sustainability and the Environment for the Inquiry into the Management of Lowland Native Grasslands, Parks Conservation and Lands, August 2008, page 5.

[20] Report from Parks Conservation and Lands to the ACT Commissioner for Sustainability and the Environment for the Inquiry into the Management of Lowland Native Grasslands, Parks Conservation and Lands, August 2008, page 6.

— may contain small populations of threatened species in marginal or fragmented habitat that is considered to be not viable in the medium to long term.[21]

This classification also helps prioritise sites for protection. The category of each lowland native grassland site is shown in Table 1.

While this investigation focuses on one of the threatened ecosystems in the ACT, it is important to acknowledge that the Yellow Box (*Eucalyptus melliodora*)–Red Gum (*E. blakelyi*) Grassy Woodland (declared endangered under the *Nature Conservation Act 1980* (ACT)) is also a threatened ecosystem. In addition, the Flora and Fauna Committee is currently considering a nomination for the Snow Gum (*E. pauciflora*)–Candlebark (*E. rubida*) Tableland Woodland to be declared endangered under the *Nature Conservation Act 1980* (ACT).

The Yellow Box–Red Gum Grassy Woodland and Snow Gum-Candlebark Tableland Woodland ecosystems are of relevance to this investigation as they interconnect with the Natural Temperate Grassland on the lower slopes, forming a vegetation mosaic.[22] As such, these ecosystems are subject to similar pressures and threatening processes as the lowland native grassland.[23] Accordingly, some findings from this investigation may be relevant to these two ecosystems.

1.3 Investigation process

Action Plan No. 28 identifies the lowland native grassland sites in the ACT and defines the sites considered in this investigation. The distribution of lowland native grassland sites in the ACT is included at Appendix 3. A summary for each lowland native grassland site is included in Appendix 4.

This investigation was undertaken in two stages in response to the need for urgent action to be taken on Lawson Commonwealth – Belconnen Naval Transmission Station site (BE08(a)), a Core Conservation Site. As such, this site was the focus of the first stage of this investigation.

On 21 November 2007 a meeting was held with key stakeholders for a roundtable discussion concerning relevant matters relating to the investigation.

A media release from this Office advising of the investigation and inviting submissions was issued on 30 November 2007 (*see* Appendix 5). On 1 December 2007 an advertisement was placed in *The Canberra Times* that also advised of this investigation and invited submissions (*see* Appendix 6). Both the media release and the advertisement advised that the time for lodging submissions relating to Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)) closed on 14 December 2007 and that the closing date for all other submissions was 25 January 2008. This Office received and considered submissions from 17 individuals, groups and organisations (*see* Appendix 7).

Since publication of Action Plan No. 28 an area (38.5 hectares) of native grassland on Kama South (BE12), adjacent to the Molonglo River has been identified as an additional remnant of

[21] Action Plan No. 28, pages 56–59.

[22] National Recovery Plan for Natural Temperate Grassland of the Southern Tablelands (NSW and ACT), Commonwealth, 2006.

[23] Environment ACT, *Woodland for Wildlife, ACT Lowland Woodland Conservation Strategy*, Action Plan No. 27.

the Natural Temperate Grassland. In addition, following a submission from the North Belconnen Landcare Group, Evatt Footbridge was included making a total of 49 sites considered in this investigation.

On 26 February 2008, the *Report on Belconnen Naval Transmission Station (BNTS) Site as part of the Investigations into ACT Lowlands Grasslands,* which included 11 recommendations was submitted to the Chief Minister, then also Minister for the Environment. It was publicly released in early March 2008.

Between February 2008 and January 2009, the remaining lowland native grassland sites were investigated. This included site visits with staff from this Office and the responsible land managers and rural lessees. Meetings were also held with the responsible land managers and stakeholders to discuss issues relevant to specific sites and lowland native grassland in general.

This Office engaged Dr Ken Hodgkinson from the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) Sustainable Ecosystems Division to undertake an ecological assessment of all sites, except Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)). Dr Hodgkinson's terms of reference are set out in the box on the following page and his report is at Appendix 8.

Upon finalisation of Dr Hodgkinson's report, this Office conducted:

- meetings with the responsible land managers for sites on National Land
- a roundtable discussion with relevant offices from the Department of Territory and Municipal Services, on 10 October 2008
- a meeting of all relevant Australian Government departments about the proposed excision of the Majura Training Area (MA01) site from the Department of Defence, on 14 October 2008.

A draft report, in particular the recommendations, were discussed with the relevant Commonwealth and Territory officers in early January 2009. The views from these discussions and submissions have been considered in finalising this report. Expert advice was sought from Ms Sarah Sharp (an independent ecologist with expertise in lowland native grassland) and Dr Lyn Hinds (CSIRO, eminent marsupial expert). In January 2009, a draft of this report was considered by an expert panel comprising:

- Dr Andrew Baird (CSIRO Veterinarian)
- Dr Ken Hodgkinson (CSIRO Ecologist)
- Dr Sue McIntyre (CSIRO Senior Principal Research Scientist)
- Dr Will Osborne (University of Canberra).

Mr Darro Stinson, the ex-Commissioner for the Environment, facilitated the expert panel and Ms Sarah Sharp provided technical advice. The advice from this expert panel is included as Appendix 10.

This report was given to the Minister on 12 March 2009. Pursuant to section 22 of the *Commissioner for the Environment Act 1993*, the Minister must, within 15 sitting days after the day of receiving the report, present the report or recommendation to the Legislative Assembly. He may choose to publicly release it earlier. This report also includes the *Report on*

Belconnen Naval Transmission Station Site as part of the Investigation into ACT Lowlands Grasslands, February 2008 (*see* Appendix 1).

Table 1: Ecological characteristics of ACT lowland native grassland sites[a]

Site name	Site no.	Total area of site (ha)	Area NTG (ha) endangered community	Threatened species	Conservation category[b]
Majura Valley					
Majura Training Area	MA01	126.6	113.7	BW, GED, GSM, PG, SLL	1
Air Services Beacon	MA02	10.7	10.7	SLL	1
Canberra International Airport[e]	MA03	203.6	73.6	GED, GSM	1
'Malcolm Vale'	MA04	155.4	-	GED	2
Campbell Park	MA05	11.7	10.9	BW, GED, GSM, PG, SLL	1
Majura West	MA06	133.3	-	GED	1
Jerrabomberra Valley					
Mugga Mugga Homestead	JE01	15.0	15.0	-	2
'Callum Brae'	JE02	162.7	-	GED	1
Jerrabomberra West Reserve	JE03	116.9	115.2	GSM, GED, PTWL, SLL	1
Woods Lane	JE04	10.3	10.3	BW	2
Jerrabomberra East Reserve	JE05	72.0	62.2	GED, SLL	1
Harman Bonshaw South	JE06	105.7	-	GED, GSM	1
Harman Bonshaw North	JE07	114.6	46.3	BW, GED, SLL	1
'Cookanalla'	JE08	81.5	-	GED	2
AMTECH	JE09	18.0	18.0	GED	2
Tennant Street, Fyshwick	JE10	0.3	0.3	BW	2
Gungahlin					
Mulanggari Nature Reserve	GU01	68.5	58.6	GSM, SLL	1
Gungaderra Nature Reserve	GU02	187.3	41.9	GSM, SLL	1
Crace Nature Reserve	GU03	136.0	61.5	BW, GSM, PG, SLL	1
North Mitchell	GU04	15.9	14.8	GSM	2
Mitchell	GU05	1.6	1.6	SLL	2
Canberra Riding Club	GU06	0.3	0.3	-	3

Site name	Site no.	Total area of site (ha)	Area NTG (ha) endangered community	Threatened species	Conservation category[b]
Wells Station Road	GU07	0.2	0.2	-	3
Nicholls	GU08	0.3	0.3	-	3
Belconnen					
Ginninderra Experimental Station	BE01	19.4	18.9	-	2
Dunlop Nature Reserve	BE02	81.9	81.9	GSM	1
'Jarramlee'	BE03	52.0	52.0	-	2
Umbagong Park South, Florey[c]	BE04(a)	15.5	9.0	-	2
Umbagong Park North, Florey	BE04(b)	-	-	-	3
Evatt Powerlines	BE05	1.1	1.1	-	3
Lake Ginninderra	BE06	1.9	1.9	GSM	2
Lawson Territory	BE07	59.2	3.3	GSM	3
Lawson Commonwealth (Belconnen Naval Transmission Station)[d]	BE08(a)	120.3	120.3	GP, GSM, PO	1
Lawson Commonwealth (east)	BE08(b)				
Kaleen east paddocks	BE09	28.2	4.0	-	3
Caswell Drive[e]	BE10	5.8	5.8	-	1
Glenloch Interchange	BE11	2.2	2.2	-	1
Kama South[f]	BE12	38.5	38.5	-	1
Central Canberra/Tuggeranong					
CSIRO Headquarters, Campbell	CC01	3.0	3.0	GSM	2
Constitution Avenue, Reid	CC02	0.7	0.7	GSM	2
St Johns Church, Reid	CC03	0.9	0.9	GSM	2
Australian Centre for Christianity and Culture, Barton	CC04	1.9	1.9	BW, GSM	1
York Park, Barton	CC05	0.4	0.4	GSM	2
Yarramundi Reach	CC06	21.2	21.2	GSM, SLL	2
Lady Denman Drive, Yarralumla	CC07	0.4	0.4	GSM	2

Site name	Site no.	Total area of site (ha)	Area NTG (ha) endangered community	Threatened species	Conservation category[b]
Dudley Street, Yarralumla	CC08	2.2	1.5	GSM	2
Guilfoyle Street, Yarralumla[g]	CC09	0.8	0.8	BW	2
Novar Street, Yarralumla	CC10	0.2	0.2	-	3
Black Street, Yarralumla	CC11	3.6	3.6	GSM	2
Isabella Pond, Monash	TU01	1.2	1.2	-	1

Notes:

BW = Button Wrinklewort; GED = Grassland Earless Dragon; GP = Ginninderra Peppercress; GSM = Golden Sun Moth; PG = Perunga Grasshopper; PTWL = Pink-tailed Worm Lizard; SLL = Striped Legless Lizard.

a Lowland native grassland sites are defined as the areas that have separate land uses or ownership, or are separated by major road or development, or by a significant area of other vegetation (native or exotic). Some sites are adjacent to each other, forming larger grassland units.

b Category 1: Core Conservation Sites – sites in this category meet the following criteria: high botanical significance rating, or key threatened species habitat, or large sites (more than 100 hectares) with a botanical significance rating of 3.

Category 2: Complementary Conservation Sites – sites in this category meet the following criteria: moderate botanical significance rating, or threatened species habitat, or medium area sites (10 to 100 hectares) with a botanical significance rating of 4.

Category 3: Landscape and Urban Sites – sites in this category meet the following criteria: low to very low botanical significance rating; and small to very small area (less than 10 hectares); and may contain small populations of threatened species in marginal or fragmented habitat that is considered to be not viable in the medium to long term (see Action Plan No. 28, pages 56–59).

c Umbagong Park North and South are identified as one site in Action Plan No. 28 and counted as one site in this investigation.

d Lawson Commonwealth is identified as one site in Action Plan No. 28 and counted as one site in this investigation.

e Since 2005 part of the grassland in the site has been destroyed.

f Since publication of Action Plan No. 28 an area (38.5 hectares) of native grassland on Kama South, adjacent to the Molonglo River, has been identified as an additional remnant of the Natural Temperate Grassland (NTG).

g This site is incorrectly named as Kintore Street in Action Plan No. 28.

TERMS OF REFERENCE FOR ECOLOGICAL ASSESSMENT OF LOWLAND NATIVE GRASSLAND SITES UNDERTAKEN BY DR HODGKINSON

1. Review the:

(a) Action Plan No. 28 *A Vision Splendid of the Grassy Plains Extended ACT Lowland Native Grassland Conservation Strategy*

(b) National Recovery Plan for Natural Temperate Grassland of the Southern Tablelands (NSW and ACT): An Endangered Ecological Community, January 2006

(c) ACT Nature Conservation Strategy

(d) advise whether any conservation management principles in addition to those set out in these documents are required to protect the Natural Temperate Grassland of the ACT.

2. Inspect and take at least one photograph of each Natural Temperate Grassland site in the ACT except for the Belconnen Naval Transmission Station site.

3. Identify, through a visual inspection, those sites, if any, approaching a critical threshold beyond which unacceptable degradation will occur and identify the causes of the deterioration.

4. Review the existing management arrangements in relation to each grassland site and:

(a) in relation to each site approaching a critical threshold beyond which unacceptable degradation will occur identify the actions needed to protect the Natural Temperate Grassland on the site in the:

(i) immediate to short-term; and

(ii) long term.

(b) in relation to all other grassland sites identify, for specific individual sites and / or a group of sites, any management changes that are needed to protect the Natural Temperate Grassland on the site or sites in the:

(i) short term; and

(ii) long-term.

1.4 Update on Belconnen Naval Transmission Station site

The Lawson Commonwealth – Belconnen Naval Transmission Station site (BE08(a)) was the focus of the first stage of this investigation (*see* Section 1.3), and on 26 February 2008, the report on this site was submitted to the ACT Government and subsequently made public in March 2008. An update on the progress in implementing the 11 recommendations contained in this report is presented in Table 2.

A meeting was held between the Department of Defence, the ACT Environment Protection Authority and the Office of the Commissioner for Sustainability and the Environment on 10 October 2008 regarding remediation of the Belconnen Naval Transmission Station (BE08(a)) site, in particular the need to ensure the integrity and protection the lowland native grassland.

Officers from the Department of Territory and Municipal Services at a meeting on 5 January 2009 indicated that Recommendation 11 – review of the memorandum of understanding between the Department of Defence and ACT Government (Department of Territory and Municipal Services) – is yet to be finalised.

Table 2: Progress on implementation of recommendations contained in the Commissioner for Sustainability and the Environment Report on Belconnen Naval Transmission Station

Recommendation	Implementation
Recommendation 1 Urgent action is to be taken to restore the ecological condition of the Grasslands, and provide opportunities for the Perunga Grasshopper, Golden Sun Moth and Ginninderra Peppercress to survive and thrive at BNTS.	The culling of kangaroos on the site has significantly reduced the grazing pressure. The Department of Defence has fenced off the areas containing the Ginninderra Peppercress.
Recommendation 2 Kangaroos are to be removed immediately from BNTS to achieve a stocking rate of 1 kangaroo per hectare or less. This is to be done by the land manager, preferably before the end of April 2008 to prevent impacts on pasture biomass occurring during the dormant 2008 winter season.	A cull was completed by the end of May 2008.
Recommendation 3 Kangaroo population numbers are to be maintained at the targeted level for the foreseeable future using fertility-controlled kangaroos only. A program to maintain this situation is to be implemented as needed. (This recommendation is made on the assumption that all remaining kangaroos at BNTS will be part of fertility control research programs.)	It is understood that 100 animals in the long-term will remain on-site and that these will be used for fertility control research.
Recommendation 4 Further reductions in the number of kangaroos at BNTS (that is, even below the proposed stocking rate of 1 kangaroo per hectare) is to occur if recovery of the grasslands does not improve over the next growing season even if research projects are compromised.	An issue to be addressed in the future.
Recommendation 5 Kangaroos are to be removed from BNTS by the most humane method suitable for that site having regard to advice from the AFP that firearms are not to be used at BNTS. (The Expert Panel has recommended sedating by darting followed by euthanasia by lethal injection.)	The kangaroos were culled by herding, sedation by darting followed by euthanasia by lethal injection. AFP would not give permission to use firearms due to site conditions and the proximity to residential areas.
Recommendation 6 The policy of the Conservator of Flora and Fauna, to the effect that translocation of eastern grey kangaroos is not an appropriate management technique, is to remain unchanged and that this policy position be confirmed to the Department of Defence immediately.	No translocation has been undertaken.
Recommendation 7 The interim grasslands management plan and interim kangaroo management plan for BNTS are to be completed by the end of August 2008, by the land manager, in consultation with key stakeholders. These plans are to adopt adaptive management principles and be based on a stocking rate of 1 kangaroo per hectare or less prior to the 2008 winter.	It is understood that the Department of Defence has informally provided Territory and Municipal Services with a draft management plan for comment.
Recommendation 8 Conditions at BNTS are to be reported on a quarterly basis to all relevant agencies and to the Commissioner's Office. The Commissioner is to establish an independent group to assist her evaluate progress and report on this in her annual report.	Defence has informed the Office that conditions are stable. The post-Spring quarterly report will be important in assessing recovery.

Recommendation	Implementation
Recommendation 9 A long-term grasslands management plan covering BNTS is to be developed prior to the abutting Lawson lands being developed for residential purposes. This plan should incorporate clear management objectives and be based on an adaptive management approach to protect the Grasslands, Perunga Grasshopper, Golden Sun Moth and Ginninderra Peppercress at the BNTS. (The interim grasslands management plan and interim kangaroo management plan (Recommendation 7) should be incorporated into the long-term plan. This long-term plan could cover all ACT natural temperate grasslands areas.)	If the site comes into government ownership, this will be the responsibility of Territory and Municipal Services.
Recommendation 10 The Territory is to ensure that legal measures are implemented to protect and preserve the high conservation value of the Grasslands and its threatened species when the land at BNTS is transferred from the Commonwealth to another entity. (This recommendation is made on the assumption that Territory laws will fully prevail post the transfer.)	An issue to be addressed in the future.
Recommendation 11 The review of the memorandum of understanding between the Department of Defence and ACT Government (Territory and Municipal Services) is to be completed by August 2008.	It is understood that the Executive Director, Environment and Recreation has written to the Department of Defence and the Department for Environment, Water, Heritage and the Arts as a first step towards achieving this recommendation. No response has been received to date.

Source: Commissioner for Sustainability and the Environment Australian Capital Territory Annual Report 2007–08, 2008, pages 12–13.

2 Legislation and policy

An understanding of legislation relevant to ACT lowland native grassland sites and the species they support is important as it establishes the legal framework for what can, and should, occur. Four types of legislation are relevant to this investigation, they are:

- planning
- conservation
- heritage
- animal welfare.

2.1 Planning legislation

The planning legislation relevant to the ACT lowland native grassland sites is:

- *Australian Capital Territory (Planning and Land Management) Act 1988* (Cwlth)
- *Planning and Development Act 2007* (ACT).

2.1.1. Australian Capital Territory (Planning and Land Management) Act 1988

The *Australian Capital Territory (Planning and Land Management) Act 1988* (Cwlth) provides for two categories of land in the ACT:

- National Land, which is used by or on behalf of the Commonwealth, and managed by the Commonwealth.
- Territory Land, which is all the remaining land of the ACT. The ACT Government manages this on behalf of the Commonwealth.

The National Capital Plan (2003) sets out general land use policies for the Territory as a whole and specifies areas of land that have the special characteristics of the National Capital. These areas are called Designated Areas. The National Capital Plan provides detailed planning policies and guidelines for Designated Areas. The National Capital Authority has planning responsibility for these areas, which may be either National Land or Territory Land. Planning for Territory Land that is not a Designated Area is the responsibility of the ACT Planning and Land Authority and planning policies are set out in the Territory Plan 2007.

Sixteen lowland native grassland sites are wholly or partially on National Land (*see* Table 4). As such, the Australian Government has primary responsibility for managing these sites. Recommendations made in this report relative to these sites are aimed at fostering action by an Australian Government agency.

2.1.2 *Planning and Development Act 2007*

The *Planning and Development Act 2007* (ACT) establishes the ACT Planning and Land Authority and its functions including to:

- prepare and administer the Territory Plan
- grant, administer, vary and end leases on behalf of the Executive

- grant licences over unleased Territory Land.[24]

The objective of the Territory Plan 2008 is to ensure, in a manner not inconsistent with the National Capital Plan, the planning and development of the ACT provides an attractive, safe, and efficient environment for the people of the ACT to live, work and have their recreation.[25]

All land that falls within the Territory Plan (Territory Land) is defined according to allowable land uses, including public land (for example, Nature Reserves, Special Purpose Reserves, and Urban Open Space), Industrial and Residential Land and Rural. To change a land use requires a Variation of the Territory Plan. Land is managed in accordance to defined land uses. For each land use, the Territory Plan defines objectives by which the sites are to be protected and managed.

Sites on Territory Land that are defined as Nature Reserve, Special Purpose Reserve or National Park have the highest level of protection; eight lowland native grassland sites are zoned as Nature Reserves, they are:

- 'Callam Brae' (part JE02), Jerrabomberra West Reserve (JE03), Jerrabomberra East Reserve (JE05),[26] Mulanggari Nature Reserve (GU01), Gungaderra Nature Reserve (GU02), Crace Nature Reserve (GU03), North Mitchell (GU04) and Dunlop Nature Reserve (BE02).
- Mugga Mugga Homestead (JE01) is a Special Purpose Reserve.

While not having the same level of protection through defined objectives for land use and management, all unleased Territory Land that is declared Urban Open Space requires a plan of management; such plans must be reviewed at least every 10 years.[27] The 10 sites zoned Urban Open Space are:

- Nicholls (GU08); Umbagong Park, Florey (BE04); Evatt Powerlines (BE05); Lake Ginninderra (BE06); Evatt Footbridge; CSIRO Headquarters, Campbell (CC01); Constitution Avenue, Reid (CC02); Dudley Street, Yarralumla (CC08); Novar Street, Yarralumla (CC10); Black Street, Yarralumla (CC11); and Isabella Pond, Monash (TU01).

Chapter 9 of the *Planning and Development Act 2007* (ACT) provides details about the lease and licence system for lands in the ACT. Leases generally offer a long-term arrangement whereas licences are temporary in nature. Twelve leases are held over Territory Land, which are lowland native grassland sites (*see* Table 4). Grassland sites that are subject to various leases range from rural to site-specific activities. The majority of leases (seven) over grassland sites are rural. All rural leases are subject to land management agreements that specify how the land is to be managed. There are eight grazing licences on lowland native grassland sites (*see* Table 4).

The ACT Planning and Land Authority is responsible for the policy and overall administration and enforcement of the Territory's licence and lease system. Licences and

[24] *Planning and Development Act 2007.*

[25] *Planning and Development Act 2007*, sections 25 and 48.

[26] Requires a variation to the Territory Plan 2008; the ACT Planning and Land Authority is currently awaiting comments from the Department of Territory and Municipal Services.

[27] Section 332 (2)(a).

rural leases with the supporting land management agreements can be used to protect lowland native grassland. This investigation found that there was some confusion between ACT Planning and Land Authority and Territory and Municipal Services staff about enforcement responsibility for land management agreements. The rural lease administration system is complex and this seems to have contributed to the confusion. However, the Department of Territory and Municipal Services is the government's land management agency and therefore it seems to be the appropriate agency to exercise enforcement powers with respect to land management agreements. This department is also responsible for ensuring Action Plan No. 28 is implemented)

This complex administration system appears to have no significant advantages. During this investigation it became apparent that enforcement of conditions in land management agreements in rural leases seemed to be lacking, possibly because it is too difficult given the current system. Licences also appear to vary for no apparent reason. Standardising these licences make their administration easier. The administrative and legislative arrangement for rural licences and leases needs to be streamlined.

Chapter 10 of the *Planning and Development Act 2007* (ACT) provides details about the management of public land, which includes Nature Reserves, Urban Open Space and Special Purpose Reserves. There are 18 (37%) lowland native grassland sites on public land; this potentially affords a very high level of protection. Section 319 of the Act deals with plans of management and provides that the custodian for an area of public land must prepare a draft plan of management of the area as soon as practicable after the area is identified as public land in the Territory Plan. Section 332 of the Act provides that the custodian of the land must review the plan of management at least once every 10 years. This is an important way of ensuring that ACT Government agencies keep plans current that affect the 18 lowland native grassland sites on public land (this is further discussed in Section 3 in relation to specific sites). It is questionable as to whether the planning legislation is the appropriate vehicle for directing management planning of nature conservation areas. It maybe more appropriate for this, and other land management issues associated with nature conservation to be enshrined in nature conservation legislation. The current review of the *Nature Conservation Act 1980* (ACT) provides an opportunity for this to be considered and addressed.

Recommendation 1: Streamline ACT Government planning and nature conservation legislation to ensure all land management matters are covered by the *Nature Conservation Act 1980* (ACT) (currently under review).

2.2 Conservation legislation

Three pieces of conservation legislation are relevant to ACT lowland native grassland sites, namely the:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
- *Nature Conservation Act 1980* (ACT)
- *Heritage Act 2004* (ACT).

2.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) provides a legal framework for protection and management, nationally and internationally, of important

flora, fauna, ecological communities and heritage places defined in the Act as matters of national environmental significance.

Natural Temperate Grassland of the Southern Tablelands (NSW and ACT) is listed as an endangered ecological community under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (and also under Territory legislation). In addition, with the exception of the Perunga Grasshopper, all the flora (Button Wrinklewort and Ginninderra Peppercress) and fauna (Striped Legless Lizard, Grassland Earless Dragon and Golden Sun Moth) species associated with the Natural Temperate Grasslands that are declared threatened under Territory legislation are also listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).

National Heritage System

The National Heritage System, which operates under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), is a framework for listing and protecting natural and cultural heritage places across Australia.

In line with a 1997 intra-governmental agreement, the Australian Government focuses on protecting heritage places of outstanding significance to the nation or places the Australian Government owns or manages. The *Commonwealth Heritage Lists*, implemented in 2004, is an important mechanism for protecting heritage places.

The *Commonwealth Heritage Lists* is a list of places the Australian Government either owns or manages that have 'significant heritage value to the Nation'. Only one grassland site in the ACT is listed and this is Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)) for Golden Sun Moth (*Synemon plana*) habitat. This listing affords the grassland an 'additional layer of protect' from any future development proposals. Another six ACT lowland native grassland sites are being considered for listing as 'Natural Areas' on the *Commonwealth Heritage Lists* (*see* Table 3).

The Register of the National Estate, implemented in 1975, lists over 13,000 places (253 in the ACT). Following changes to the heritage system in 2007, the Australian Government decided to freeze the Register and remove its statutory provisions (relating mainly to Australian Government agencies and Commonwealth land) by February 2012. Lawson Commonwealth – Belconnen Naval Transmission Station (BE08) is listed on the Register of the National Estate.

Any proposed action in relation to species or places listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) must be referred to the Australian Government Minister for the Environment, Water, Heritage and the Arts if the planned action could have a 'significant impact', as defined by that Act, on the environment. If the proposed action (or 'referral') is found likely to have a significant impact on matters of national environmental significance, the Minister's approval must be sought. In these situations, the Minister seeks public comment and considers these, along with social, economic and other potential impacts in making a decision.

On 31 October 2008, the Minister for the Environment, Water, Heritage and the Arts commissioned an independent review of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth). This is the first review of the Act since its commencement on

16 July 2000. The review will assess the operation of the Act and the extent to which its objectives have been achieved.

This investigation found limitations in the level of protection that could be secured for Natural Temperate Grassland under the *Environmental Protection and Biodiversity Conservation Act 1991* (Cwlth). Submissions were invited as part of the Commonwealth's review of this legislation. The Commissioner's Office made a submission, which recommended, among many things, that this Act should:

- facilitate consideration of cumulative impacts of proposed developments, on listed and non-listed communities and species, with respect to referrals to the department for assessment
- be triggered by 'no action', that is, not undertaking needed land management actions
- identify the best option for protecting a listed community or species rather than only assessing the presented option
- strongly foster compliance and enforcement activities.

Recommendation 2: The *Environmental Protection and Biodiversity Conservation Act 1991* (Cwlth) should be strengthened so sites and species are more effectively protected and managed.

2.2.2 Nature Conservation Act 1980

The *Nature Conservation Act 1980* (ACT) makes provision for protecting and conserving native animals and native plants and for reserving areas for those purposes.

Part 2 of the *Nature Conservation Act 1980* (ACT) establishes the role of Conservator of Flora and Fauna and provides authority for the Conservator to manage public land reserved for conservation of the natural environment. It also establishes the Flora and Fauna Committee with the functions of:

- providing advice to the responsible Minister in relation to nature conservation
- exercising such powers as are provided for under the Act.

Section 21 of the *Nature Conservation Act 1980* (ACT) authorises declaration of a species or ecological community, by the Minister for the Environment, based on advice from and recommendations made by the ACT Flora and Fauna Committee, with respect to:

- vulnerable or endangered species
- an endangered ecological community
- a threatening process.

Part 3 of the *Nature Conservation Act 1980* (ACT) makes provision for the Conservator to prepare action plans for species, communities or processes declared to be vulnerable or endangered. Once declared, the ACT Government is obligated under the Act to prepare an action plan that sets out strategies for reducing threats to the species and strengthening protection measures. The ACT Government's adopted policies and actions for protecting threatened grassland communities are defined in Action Plan No. 28, which is discussed in Section 2.4: Conservation policy of this report.

A declaration under this section is a disallowable instrument, which once tabled in the Legislative Assembly becomes a government policy that must be considered in making decisions on matters to which it is relevant. Action Plan No. 28 is a disallowable instrument and although it must be considered with respect to development decisions it is not binding. As such, when a new development is proposed on a lowland native grassland site unless the site has threatened species under the provisions of either the *Nature Conservation Act 1980* (ACT) or the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), these sites do not have any legal status for protection. This highlights the need for the ACT Planning and Land Authority to seek advice on these sites and make information available to the community and developers on their location.

Section 47 of the *Nature Conservation Act 1980* (ACT) empowers the Conservator of Flora and Fauna to issue directions to the occupier of land for protection or conservation of significant natural values. Conservator's Directions have been issued to some leases on lowland native grassland sites to ensure protection of the grassland and of the Grassland Earless Dragon habitat.

The ACT is unique in having a Conservator of Flora and Fauna whose powers can be used to afford extra protection to specific sites or species. The Conservator's role and functions are broad and it is possible for the Conservator of Flora and Fauna to be the same officer who is responsible for undertaking land management functions on Territory Lands. The legislation that creates the Conservator of Flora and Fauna, the *Nature Conservation Act 1980* (ACT), is currently under review. It is understood that as part of this review issues associated with the Conservator's role and functions will be part of a public discussion paper.

Given that 60% of the Territory's lowland native grassland sites need urgent land management action, it is important that the Conservator have powers to direct that appropriate land management actions be undertaken.

Recommendation 3: As part of the current review of the *Nature Conservation Act 1980* (ACT), ensure that lowland native grassland, in particular Natural Temperate Grassland ecosystems are protected by the Conservator of Flora and Fauna having powers to direct, when necessary, that land management actions be undertaken.

2.3 Heritage and animal welfare legislation

Other legislation that is relevant to ACT lowland native grassland sites are the:

- *Heritage Act 2004* (ACT)
- *Animal Welfare Act 1992* (ACT)

2.3.1 Heritage Act 2004

The *Heritage Act 2004* (ACT) provides for recognition, registration and conservation of places and objects of natural and cultural or other significance. Under the *Heritage Act 2004* (ACT), natural items, such as native grassland sites, can be protected and conserved using heritage agreements, heritage orders, conservation management plans and guidelines.

A number of lowland native grassland sites have been nominated for listing on the Heritage Register. These sites are currently under assessment and are presented in Table 3.

Where development affects the conservation requirements of sites of heritage significance, controls become applicable under provisions of the *Planning and Development Act 2007* (ACT). Sometimes there is an opportunity to include clearance controls in land occupancy conditions (such as leases, land management agreements or agistment conditions).[28]

To help determine appropriate long-term land use for some lowland native grassland sites, the heritage status of lowland native grassland sites that have been nominated for heritage listing needs to be resolved. The sites nominated for inclusion on the ACT Heritage List (those also nominated on the *Commonwealth Heritage Lists* are listed in *italics*):

- Majura Training Area (MA01), Air Services Beacon (MA02), Canberra International Airport (MA03), 'Malcolm Vale' (MA04), *Campbell Park* (MA05), *Majura West* (MA06), '*Callum Brae*' (JE02), *Jerrabomberra West Reserve* (JE03), *Jerrabomberra East Reserve* (JE05), *Harmon Bonshaw South* (JE06), Harmon Bonshaw North (JE07), Lawson Territory (BE07), Lawson Commonwealth (BE08(a) and (b)), Kama South (BE12), Black Street, Yarralumla (CC11).

Recommendation 4: Resolve the heritage status of lowland native grassland sites, in a timely manner, to assist long-term planning.

Table 3: Protection status of lowland native grassland sites under Commonwealth and ACT Heritage Acts

Site name	Site no.	Commonwealth Heritage List	ACT Heritage Register
Majura Valley			
Majura Training Area	MA01	–	Nominated
Air Services Beacon	MA02	–	Nominated
Canberra International Airport	MA03	–	Nominated
'Malcolm Vale'	MA04	–	Nominated
Campbell Park	MA05	Nominated	Nominated
Majura West	MA06	Nominated	Nominated
Jerrabomberra Valley			
'Callum Brae'	JE02	Nominated	Nominated
Jerrabomberra West Reserve	JE03	Nominated	Nominated
Jerrabomberra East Reserve	JE05	Nominated	Nominated
Harman Bonshaw South	JE06	Nominated	Nominated
Harman Bonshaw North	JE07	–	Nominated
Belconnen			
Lawson Territory	BE07	–	Nominated
Lawson Commonwealth – Belconnen Naval Transmission Station	BE08(a)	Listed	Nominated
Kama South	BE12	–	Nominated
Central Canberra/Tuggeranong			
Black Street, Yarralumla	CC11	–	Nominated

[28] *Nature Conservation Act 1980* (ACT) page 32, para 5.

2.3.2 Animal Welfare Act 1992

The *Animal Welfare Act 1992* (ACT) is an Act for promoting animal welfare and related purposes. This Act has relevance to this investigation in terms of all animals including kangaroos, which need to be reduced in numbers on some sites, to ensure survival of endangered Natural Temperate Grassland ecosystems and other animals.[29]

2.4 Conservation policy

Conservation policies encompassing management principles for the lowland native grassland can be found in:

- the ACT Nature Conservation Strategy 1997
- Action Plan No. 28 (ACT)
- National Recovery Plan for Natural Temperate Grassland of the Southern Tablelands (New South Wales and ACT), (Commonwealth) 2006.

Dr Hodgkinson reviewed these policies and advised on whether any conservation management principles, in addition to those set out in these documents, are required to protect the Natural Temperate Grassland of the ACT. Dr Hodgkinson's findings are quoted in the box on the following page.

2.5 Policy and legislative directions

The ACT is in a strong position to protect the last remaining viable examples of lowland native grasslands and the threatened species that rely on them. The challenge will be to manage these areas so as to improve their ecological condition and to enhance the habitat of threatened species so that populations increase to levels where their viability may be more assured.

Conservation of the lowland native grassland is currently being directed through a series of agreements, in particular memoranda of understanding (between Australian Government agencies and the ACT Government) or licences and leases (between rural lessees and the ACT Government). These agreements, if implemented, can be effective for formalising administrative arrangements for the lowland native grassland sites. However, this investigation found that these arrangements have some limitations (*see* Section 3: Management arrangements) and could be enhanced.

2.5.1 Conservation leases

Rural lands contribute substantially to the Territory's biodiversity value. A conservation lease could replace some rural leases, particularly in areas with significant environmental value, such as Natural Temperate Grasslands. Conservation lease conditions could provide incentives for the leaseholder to protect this value. Some form of incentive would ensure landholders are recognised for activities they undertake that benefit the wider community.

Community groups or individuals could be encouraged to hold conservation leases to actively manage sites.

[29] Two codes of practice are also relevant (*see* Section 4.2.1 of this report).

DR HODGKINSON'S FINDINGS:

THE ACT NATURE CONSERVATION STRATEGY

Earlier, a strategy for nature conservation in the ACT was developed (ACT Government 1998). In broad terms, the need for reserving important natural areas in the ACT was established, the importance of complementary off-reserve systems was recognised, the task of restoring species and plant communities threatened with extinction was understood, the need to monitor biodiversity was seen to be critical for management and reporting, the threats to biodiversity in the ACT were identified to be pest animals, environmental weeds, changed fire regimes, degradation of aquatic systems and the clearing of natural vegetation, and finally the imperative to involve the community in nature conservation was stated clearly. This foundation document adequately brought together the best practice that had emerged from Australia's ecological research. The document is comprehensive; it has not been weakened by subsequent scientific theories or research. The strategy does not require revision at this time and can be used with confidence into the near future.

ACTION PLAN NO. 28[30]

In the following seven years, programs to implement the strategy (ACT Nature Conservation Strategy) were developed, including a strategy for conservation of the ecological community recognised as Natural Temperate Grassland (Environment ACT 2005). The strategy was built on the knowledge derived by ecological survey, that before European settlement this grassland occupied 11% of the ACT and that today 1% of the ACT contains this community and that much of this remaining grassland is degraded and continually threatened by human activity and exotic species. The strategy for conservation of this threatened grassland ecosystem is comprehensive and based on all the scientific knowledge available at the time. In the strategy, remnant sites of the Natural Temperate Grasslands are categorised and appropriate managements outlined. Category 1 sites are core conservation sites because they are of high botanical significance or they are habitat for key threatened species or they are large sites of moderate botanical significance. Category 2 sites are complementary conservation sites of moderate botanical significance or threatened species habitat or medium area sites of high botanical significance. Category 3 sites are landscape and urban sites of low to very low botanical significance or unlikely to support small populations of threatened species. In addition, two principles for general management of these grasslands, whatever their Conservation Category, are advocated; best practice and adaptive. Best practice management is extensively explored in the document but adaptive management is only outlined and as such is insufficient for implementation.

NATIONAL RECOVERY PLAN FOR NATURAL TEMPERATE GRASSLAND OF THE SOUTHERN TABLELANDS (NSW AND ACT) (CWLTH)

A national recovery plan for the Natural Temperate Grassland was published recently. This detailed document outlines the process and resourcing required. The plan is visionary, practical and achievable.

2.5.2 Voluntary agreements

Voluntary agreements can enable landholders to acknowledge the conservation values of their land through mechanisms designed to provide a level of protection but allow for current land use to continue. Some agreements that are used in other jurisdictions are binding on future landholders and some are only binding for current landholders, while others can be revoked by landholders at any time.[31] Such agreements could be used in conjunction with existing rural leases. They could also be used with respect to non-rural lands.

[30] In June 2008, Parks Conservation and Lands' Research and Planning section prepared a Draft Implementation Report on Action Plan No. 28 for the ACT Flora and Fauna Committee.

[31] Action Plan No. 28, page 80.

For example, the New South Wales Department of the Environment and Climate Change supports the Conservation Partners Program. This initiative provides opportunities to protect and conserve significant natural and cultural heritage values on private and non-reserved public land. Long-term legal commitments are made through conservation agreements and establishment of wildlife refuges under the *National Parks and Wildlife Act 1974* (NSW). Agreements are entered into voluntarily, and complement the public national park and reserve system. Lands under the Conservation Partners Program play a critical role in connecting conservation areas to facilitate species survival and movement. They also strengthen the resilience of protected areas by acting as a buffer to threats, including the potential implications of climate change. Appropriate signage can be posted to inform the wider community of the environmental assets on the land.

Another option is property registration, for example, in New South Wales, a property that is to be managed for conservation is registered with the Department of the Environment and Climate Change. This is not legally binding and it does not change the legal status. Registration ceases when the property is sold. Appropriate signage can be posted to inform the wider community of the environmental assets on the land.

2.5.3 Bio-banking and offsets

Environmental banking programs allow investment in the environment. Developers can buy credits from authorised credit providers to offset any environmental damage caused by a proposed development. Creating a market in biodiversity credits gives incentives to protect biodiversity values.

For example, the New South Wales Department of the Environment and Climate Change has established a market-based approach Biodiversity Banking and Offsets to help address the loss of biodiversity and threatened species caused by development and to simplify the development assessment process. Such a scheme allows 'biodiversity credits' to be generated by landowners/lessees who commit to enhance and protect biodiversity values on their land. These credits can then be sold. Developers can buy these credits and use them to counterbalance (offset) the impacts on biodiversity values that are likely to occur as a result of the development.

If significant modification of a proposal to minimise impacts on subject species, populations or ecological communities is not possible, then compensatory strategies can be considered. These may include other off-site or local area proposals that contribute to long-term conservation of the subject species, populations or ecological communities.[32]

This type of strategy should be investigated in the ACT given the proposed amount of development with potential impacts on lowland native grassland sites including areas within the Eastern Broadacre Planning Study and the new suburbs of Lawson and Crace.

Since the gazettal of the *Nature Conservation Act 1980* (ACT), some innovative approaches for managing and strategically protecting ecosystems have emerged. While it is beyond the scope of this investigation to examine these, they should be considered as part of the review of the *Nature Conservation Act 1980* (ACT).

Recommendation 5: As part of the current review of the *Nature Conservation Act 1980* (ACT), ensure that lowland native grassland, in particular Natural Temperate Grassland,

[32] Department of the Environment and Conservation website at <http://www.environment.nsw.gov.au>.

ecosystems are protected by innovative mechanisms such as conservation leases, voluntary agreements, bio-banking and offsets are investigated and progressed.

3 Management arrangements

The 49 lowland native grassland sites are subject to a variety of management arrangements depending upon whether the site is on National Land or Territory Land, or if it is a Designated Area,[33] whether it is the subject of a lease, licence or if it is on public land. Furthermore, it can be the subject of a memorandum of understanding, a plan of management, and/or conservator's directions. As evident from this, management arrangements are complex.

This section examines these complex management arrangements and makes recommendations to ensure the protection and long-term sustainability of the lowland native grassland sites and their vulnerable ecosystems. The jurisdictional and management arrangements for the lowland native grassland sites are shown in Table 4.

A lowland native grassland site may have more than one responsible land manager, for example, CSIRO Headquarters, Campbell (CC01) is on both National and Territory Land. A site may also have more than one management regime, for example, Gungaderra Nature Reserve (GU02) has a Management Plan, an agistment licence and two non-rural leases (Print Handicapped Radio and Broadcast Australia). With such complex management arrangements, the aim should be to have consistent management across the entire site.

3.1 National Land

3.1.1 Memoranda of understanding

Sixteen grassland sites are either wholly or partly on National Land (*see* Table 4).

The Australian Government has legislative (planning and management) responsibility for National Land in the ACT. To encourage a coordinated approach to conservation management at all grassland sites in the ACT, the ACT Government established memoranda of understanding with national custodial land managers. This provides a formal means by which consultation between responsible land manager and the ACT Government can occur.

The memoranda of understanding relate specifically to particular sites and provide that the land manager will consult the other signatories about planning, development control policies and actions that may affect the sites. The objective of each memorandum of understanding is to establish an agreed framework and management guidelines and arrangements to:

- promote a land use and management regime that will provide for long-term protection of the ecological values of the grassland sites
- foster development of a productive and harmonious partnership between parties
- encourage a cooperative approach to resolving conservation issues that arise, including research and monitoring, information management, and liaison arrangements.

[33] Designated Areas are specified in the National Capital Plan. They are areas of land that have special characteristics of the National Capital. Any buildings or structures, demolition, landscaping or excavation works in these areas require the prior written approval of the National Capital Authority.

Table 4: Summary of jurisdictional and management arrangements for ACT lowland native grassland sites

Site name	Site no.	Jurisdiction	Custodial land manager	Purpose/land use	Management arrangement	Additional conservation specifications
Majura Valley						
Majura Training Area	MA01	National	Department of Defence	Defence	MoU	Majura Training Area Management Plan
Air Services Beacon	MA02	National (Designated)	Air Services Australia	Airport Services		
Canberra International Airport	MA03	National (Designated)	Canberra International Airport	Airport		Canberra International Airport Management Plan
'Malcolm Vale'	MA04	National	Department of Defence	Defence	MoU	
Campbell Park	MA05	National	Department of Defence	Defence	MoU	
Majura West	MA06	Territory	TAMS	Rural (agisted)	Licence (agistment)	
Jerrabomberra Valley						
'Mugga Mugga' Homestead	JE01	Territory	ACT Historic Places	Special Purpose Reserve		Management Plan for Historic Sites MS
'Callum Brae'	JE02	Territory	TAMS	Nature Reserve (part) Leases (part)	CNP MP Lease (rural) (part) Lease – Model Aircraft Club (part) Lease – Caravan park and camping ground (part)	MS LMA, CD
Jerrabomberra West Reserve	JE03	Territory	TAMS	Nature Reserve	CNP MP Lease (rural) (part)	MS LMA, CD
Woods Lane	JE04	Territory	TAMS	Roadside	Roadsides MP	
Jerrabomberra East Reserve [a]	JE05	Territory	TAMS	Nature Reserve (proposed)	CNP MP	
Harman Bonshaw South	JE06	National and Territory	Department of Defence and TAMS	Defence Rural lease	MoU Lease (rural) (part)	LMA, CD
Harman Bonshaw North	JE07	National and Territory	Department of Defence	Defence	MoU	LMA, CD

Site name	Site no.	Jurisdiction	Custodial land manager	Purpose/land use	Management arrangement	Additional conservation specifications
			and TAMS	Rural lease	Lease (rural) (part)	
'Cookanalla'	JE08	Territory	TAMS	Rural lease	Lease (rural)	LMA, CD
AMTECH	JE09	Territory	TAMS	Vacant (General, industrial + rural)		
Tennant Street, Fyshwick	JE10	Territory	TAMS	Rural (agisted)	Licence (agistment)	
Gungahlin						
Mulanggari Nature Reserve	GU01	Territory	TAMS	Nature Reserve	CNP MP	MS
Gungaderra Nature Reserve	GU02	Territory	TAMS	Nature Reserve	CNP MP Lease – Broadcast Australia (part) Lease – Print Handicapped Radio (part) Licence (agistment)	MS
Crace Nature Reserve	GU03	National and Territory	Department of Defence and TAMS	Defence Nature Reserve	MoU CNP MP Lease (rural) (part) Licence (agistment)	MS LMA
North Mitchell	GU04	Territory	TAMS	Non-Urban: Hills, Ridges and Buffers		
Mitchell	GU05	Territory	TAMS	Vacant (General + Industrial)	Licence (agistment)	
Canberra Riding Club	GU06	Territory	TAMS	Community use	Lease	
Wells Station Road	GU07	Territory	TAMS	Roadside	Roadsides MP	
Nicholls	GU08	Territory	TAMS	Urban Open Space	UOS MP	
Belconnen						
Ginninderra Experimental Station	BE01	National	CSIRO	Research	MoU	MS
Dunlop Nature Reserve	BE02	Territory	TAMS	Nature Reserve	CNP MP Licence (agistment)	MS

Site name	Site no.	Jurisdiction	Custodial land manager	Purpose/land use	Management arrangement	Additional conservation specifications
'Jarramlee'	BE03	Territory	TAMS	Rural (agisted)	Licence (agistment)	
Umbagong Park South, Florey [b]	BE04(a)	Territory	TAMS	Urban Open Space	UOS MP	MS
Umbagong Park North, Florey	BE04(b)	Territory	TAMS	Urban Open Space	UOS MP	MS
Evatt Powerlines	BE05	Territory	TAMS	Urban Open Space	UOS MP	MS
Lake Ginninderra	BE06	Territory	TAMS	Urban Open Space	UOS MP	MS
Lawson Territory	BE07	Territory	TAMS	Rural (agisted)	Licence (agistment)	
Lawson Commonwealth – Belconnen Naval Transmission Station	BE08(a)	National	Department of Defence	Defence	MoU	Belconnen Naval Transmission Station Management Plan
Lawson Commonwealth – East	BE08(b)	National	Department of Defence	Defence	MoU	
Kaleen east paddocks	BE09	Territory (Designated)	TAMS	Rural (agisted)	Horse Paddock Contract	MS
Caswell Drive	BE10	Territory (Designated)	TAMS	Rural Lease	Lease (rural)	LMA
Glenloch Interchange	BE11	Territory (Designated)	TAMS	Roadside	Roadside MP	
Kama South [c]	BE12	Territory	TAMS	Rural (agisted)	Licence (agistment)	
Evatt Footbridge [d]		Territory	TAMS	Urban Open Space	UOS MP	
Central Canberra/Tuggeranong						
CSIRO Headquarters, Campbell	CC01	National and Territory	CSIRO TAMS	CSIRO Roadside	MoU UOS MP	MS
Constitution Avenue, Reid	CC02	Territory (Designated)	TAMS	Urban Open Space	UOS MP	MS
St John's Church, Reid	CC03	Territory (Designated)	TAMS	Urban Lease	Lease	
Australia Centre for Christianity and Culture, Barton	CC04	Territory and National (Designated)	TAMS	Urban Lease	Lease	Draft Management Plan MS
York Park, Barton	CC05	National	Department of Finance	Vacant		Draft maintenance plan
Yarramundi Reach	CC06	National	NCA	Urban Open Space	MoU	
Lady Denman Drive, Yarralumla	CC07	National and Territory (Designated)	NCA TAMS	Roadside	MoU Roadsides MP	MS
Dudley Street, Yarralumla	CC08	Territory (Designated)	TAMS	Urban Open Space	UOS MP	MS

Site name	Site no.	Jurisdiction	Custodial land manager	Purpose/land use	Management arrangement	Additional conservation specifications
Guilfoyle Street, Yarralumla [e]	CC09	National	NCA	Vacant	MoU	
Novar Street, Yarralumla	CC10	Territory (Designated)	TAMS	Urban Open Space	UOS MP	MS
Black Street, Yarralumla	CC11	Territory (Designated)	TAMS	Urban Open Space	UOS MP	MS
Isabella Pond, Monash	TU01	Territory	TAMS	Urban Open Space	UOS MP	MS

Notes:

CD = Conservator's Directions; CNP MP = Canberra Nature Park Plan of Management (1999); CSIRO = Commonwealth Scientific and Research Organisation; LMA = Land Management Agreement; MoU = memorandum of understanding; MS = Site Maintenance Specifications; NCA = National Capital Authority; TAMS = Department of Territory and Municipal Services; UOS MP = Urban Parks, Sportsgrounds Management Plan; (Designated) = Designated areas under the National Capital Plan.

a Draft Variation to the Territory Plan in progress.

b Umbagong Park North and South are identified as one site in Action Plan No. 28.

c This site is additional to the Action Plan No. 28, to be added to Canberra Nature Reserve.

d Included following a submission from the North Belconnen Landcare Group.

e This site is incorrectly named as Kintore Street in Action Plan No. 28.

Significant areas of lowland native grassland are located on lands held by Australian Government departments or private agencies. One means of fostering communication and integration of activities between departments and agencies is through development and implementation of memorandum of understanding. Significant effort went into developing memoranda of understanding in 1998; however, it appears implementation was limited. A reason for this may have been lack of an across–department / agency coordination group. Given the challenges in managing lowland native grassland sites that all departments and agencies currently confront, it seems timely to update existing memoranda of understanding and focus on their implementation.

The ACT Government currently has memoranda of understanding with:

- **Department of Defence** for Majura Training Area (MA01), Malcolm Vale (MA04), Campbell Park (MA05), Harmon-Bonshaw South (JE06), Harmon-Bonshaw North (JE07), part of Crace Nature Reserve (GU03), Lawson Commonwealth (BE08(a) and (b))
- **National Capital Authority** for Yarramundi Reach (CC06), Lady Denman Drive (CC07) (part National Land), and Guilfoyle Street, Yarralumla (CC09)
- **CSIRO** for CSIRO Headquarters, Campbell (CC01) and Ginninderra Experimental Station (BE01).

The Australian Government Department of the Environment, Water, Heritage and the Arts is a signatory to each.

These memoranda of understanding were signed on 7 September 1998. It appears, from the Department of Defence memorandum of understanding, that revised schedules were prepared in October 2001. Otherwise, it would seem that there have been no revisions over the past 10 years. As such, these memoranda of understanding are somewhat dated and predate commencement of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth). All these memoranda of understanding need to be revised, reviewed and strengthened. Furthermore, while a significant effort went into developing the memoranda of understanding, in recent years implementation has been lacking.

In updating memoranda of understanding with the National Capital Authority, to ensure requirements under the National Capital Plan are met, those grassland sites on Territory Land that are Designated Areas – Kaleen East Paddocks (BE09); Caswell Drive (BE10); Glenloch Interchange (BE11); Constitution Avenue, Reid (CC02); St John's Church, Reid (CC03); Australian Centre for Christianity and Culture (CC04); Lady Denman Drive, Yarralumla (CC07); Dudley Street, Yarralumla (CC08); Novar Street, Yarralumla (CC10); and Black Street, Yarralumla (CC11) – should be included.

Recommendation 6: Existing memoranda of understanding between the ACT Government and Department of Defence, the National Capital Authority and CSIRO, with the Department of Environment, Water, Heritage and the Arts being a signatory, should be updated and implemented.

There is also an opportunity to development memoranda of understanding between the ACT Government and the Department of Finance for York Park, Barton (CC05); Air Services Australia for Air Services Beacon (MA02); and the Canberra Airport Group for Canberra International Airport (MA03). The Department of Environment, Water, Heritage and the Arts needs to be a signatory to each of these memoranda of understanding.

Recommendation 7: Develop memoranda of understanding between the ACT Government and the Department of Finance, Air Services Australia and the Canberra Airport Group, with the Department of Environment, Water, Heritage and the Arts being a signatory.

A coordination and implementation group needs to be established to ensure implementation of memorandum of understanding.

Recommendation 8: Establish a memorandum of understanding coordination and implementation group with an ACT Government agency being the lead agent.

3.2 Territory Land

Thirty-nine lowland native grassland sites are either wholly or partly on Territory Land (*see* Table 4). The ACT Government is responsible for managing Territory Land on behalf of the Commonwealth.[34] The Territory Plan provides a range of legislated land management arrangements that afford a degree of protection to lowland native grassland sites in the ACT according to their allowable land use or zone via:

- plans of management on nature reserves, urban open space and special purpose reserves
- licences and leases on other lands particularly rural.

The Territory Plan 2008 is the ACT Government's key statutory planning document and provides the policy framework for administering planning in the ACT. It directs management of land use change and development so it is consistent with strategic directions set by the ACT Government, the Legislative Assembly and the community but also so that it is consistent with the National Capital Plan.

All land that falls within the Territory Plan (Territory Land) is defined according to allowable land uses via zones including public land (for example, Nature Reserve and Urban Open Space), Industrial, Transport and Services, Residential and Non Urban. Land use is managed in accordance to the defined zones. For each zone, the Territory Plan defines objectives by which the sites are to be protected and managed. A variation of the Territory Plan is required to change a zone.

3.2.1 Plans of management

Grassland sites on public land are administered in accordance with provisions of the *Planning and Development Act 2007* (ACT). These sites generally include nature reserves, urban open space and special purpose reserves. Plans of management are mandatory under the Act for areas of public land. Grassland sites, which are subject to plans of management, are listed in Table 4.

Sites on Territory Land defined as nature reserve or national park have the highest level of protection. No lowland native grassland sites are within Namadgi National Park.[35] The primary objective defined in the Territory Plan for nature reserves is conservation of the site and associated species.

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[34] Section 29 (1) (a) of the *Australian Capital Territory (Planning and Land Management) Act 1988* (Cwlth).

[35] Montane grasslands in Namadgi National Park are included in the nationally threatened Natural Temperate Grassland of the Southern Tablelands (NSW and ACT) but are not the subject of this investigation.

Under the *Planning and Development Act 2007* (ACT) a plan of management for an area of public land must be reviewed at least once every 10 years.[36] If the plan of management is no longer appropriate for the land, a draft variation of the plan of management must be prepared.[37]

Canberra Nature Park Management Plan (1999)

The *Canberra Nature Park Management Plan* (1999) applies to all grassland sites, which are nature reserves or part nature reserves. The Management Plan does not address the specific requirements of the four grassland reserves declared since 1999 – Jerrabomberra West Reserve (JE03), Jerrabomberra East Reserve (JE05), and 'Callum Brae' (part JE02) – but the strategic directions of the Management Plan are relevant and Action Plan No. 28 guides management.

The *Canberra Nature Park Management Plan* must be reviewed by 29 July 2009.

The Management Plan states that a management strategy is to be developed for each Canberra Nature Park reserve. The strategy is to include identification of values, features and facilities, fire history, exotic species, specific management objectives, management zones, actions and priorities, and opportunities for volunteer participation.[38]

One grassland site on public land is a special purpose reserve, namely, the Mugga Mugga Homestead (JE01). The management objectives for a special purpose reserve are to provide for public and community use of the area for recreation and education.[39] The Management Plan for Historic Sites covers the Mugga Mugga Homestead (JE01).

Relationship between Canberra Nature Park Management Plan and Action Plan No. 28

The first action plan prepared for Natural Temperate Grasslands (Action Plan No. 1) predates the *Canberra Nature Park Management Plan*, and Action Plan No. 28 post-dates it. Action Plan No. 1 stated that a management plan for Natural Temperate Grassland was prepared in 1994 and that it included recommendations for management and protection of each recorded natural grassland site in the ACT. Action Plan No. 1 further stated that:

- management guidelines will incorporate principles and objectives based on scientific study, regional conservation requirements, and site-specific prescriptions that take into account the component biodiversity, habitat diversity, historical land management and processes occurring in each site
- the updated management guidelines for ACT natural grassland sites will be implemented on a site-specific basis in cooperation with relevant landholders.

It would therefore seem that the Action Plan No. 1 envisaged that there would be site-specific prescriptions as to what was to occur on each grassland site and that these prescriptions would be embodied in management guidelines. In this context, the *Canberra Nature Park Management Plan*, in referring to the grassland sites within the Gungahlin grassland nature reserves – Mulanggari (GU01), Gungaderra (GU02) and Crace (GU03) and

[36] *Planning and Development Act 2007* section 3.3.2 (2)(a).

[37] *Planning and Development Act 2007* section 3.3.2 (2)(b).

[38] *Planning and Development Act 2007* section 3.2.1.

[39] *Planning and Development Act 2007* section 3.1.6(a) and Schedule 3 Item 4.

Dunlop (BE02) – states that specific guidelines will be developed[40] and implemented.[41] This is consistent with development and implementation of reserve management strategies identified in the *Canberra Nature Park Management Plan*. However, these strategies need to be kept simple and focused on achieving results through specifying land management actions.

One of the purposes of Action Plan No. 28 is to provide a basis for planning and land management decisions with regard to areas containing lowland native grassland.[42] Action Plan No. 28 provides that the directions it contains about public land should be expressed through management plans.[43] The action plan is to inform management plans such as the *Canberra Nature Park Management Plan* (for further information, see Figure 1.1 of Action Plan No. 28).

Management plans need to be amended to reflect recent changes and afford greater protection to lowland native grassland.

Recommendation 9: Amend the *Canberra Nature Park Management Plan* (1999) to incorporate:

- Action Plan No. 28, *ACT Lowland Native Grassland Conservation Strategy* (2005)
- the new nature reserves of 'Callum Brae' (part JE02), Jerrabomberra West Reserve (JE03), Jerrabomberra East Reserve (JE05).

Annual action spreadsheets

Officers in the Research and Planning Unit in conjunction with officers in the Parks and Reserves unit of the Department of Territory and Municipal Services have developed a one-page annual action spreadsheet for each grassland site in the nature reserves of Mulanggari (GU01), Gungaderra (GU02), Crace (GU03), Dunlop (BE02) and Jerrabomberra West (JE03).

These annual action spreadsheets are essentially the same as the management strategies identified in the *Canberra Nature Park Management Plan*. The spreadsheets are seasonal in orientation, and cover a period of six years from 2005 to 2011; they also indicate that management actions are to be reviewed every two years.

Officers in the south district of the Parks and Reserves unit have advised that the spreadsheets for 'Callum Brae' (part JE02) and Jerrabomberra West Reserve (JE03) are used in a general way; however, they need updating.

While several policy and planning documents pertaining to lowland native grassland exist, not all sites are subject to annual site operation plans, or their equivalent, to guide field actions. These plans are important in assisting staff, particularly in large organisations where staff rotations may occur.

Parks Conservation and Lands (Department of Territory and Municipal Services) has developed annual action spreadsheets and management specifications for some sites, both of which are essentially annual site operation plans. These should be used as a model in developing plans for all sites. A cooperative approach between land managers, lessees and

[40] *Canberra Nature Park Management Plan*, paragraph 3.3.

[41] *Canberra Nature Park Management Plan*, paragraph 3.3.8.

[42] Action Plan No. 28, page 1 section 1.2.

[43] Action Plan No. 28, page 1 section 1.7.

Australian Government and Territory agencies is needed for these to be uniformly adopted and implemented.

Recommendation 10: Develop and implement annual site operation plans for all lowland native grassland sites.

Regional plans of management

Three regional plans of management are applicable to lowland native grassland sites:

- Belconnen's Urban Parks, Sportsgrounds and Lake Ginninderra, which commenced on 16 October 1998
- Inner Canberra's Urban Parks and Sportsgrounds, which commenced on 23 May 2000
- Tuggeranong's Urban Parks and Sportsgrounds, which commenced on 23 May 2000.

Under the *Planning and Development Act 2007* (ACT) a plan of management for an area of public land must be reviewed at least once every 10 years.[44] If the plan of management is no longer appropriate for the land, a draft variation of the plan of management must be prepared.[45]

Therefore, Belconnen's Urban Parks, Sportsgrounds and Lake Ginninderra Plan of Management should have been reviewed by 16 October 2008. Inner Canberra's Urban Parks and Sportsgrounds Plan of Management and Tuggeranong's Urban Parks and Sportsgrounds Plan of Management must be reviewed by 23 May 2010.

All three plans of management commenced after Action Plan No. 1 was prepared in 1997[46] but before commencement of Action Plan No. 28. All three plans state that there will be specific site management guidelines applied for native grassland sites as per Action Plan No. 1. In addition, each contains a one-page chart dealing with matters relevant to native grassland sites. However, the charts are not site-specific.

The Department of Territory and Municipal Services has developed guidelines that identify a mowing and burning regime for lowland native grassland sites in urban open space on Territory Land.

An area of Natural Temperate Grassland (Lake Ginninderra (BE06)) adjoining Lake Ginninderra could be afforded a higher level of protection through being managed under the plan of management covering the land adjoining Lake Ginninderra.

Recommendation 11: Amend the Belconnen Urban Parks, Sportsgrounds and Lake Ginninderra Plan of Management to include the lowland native grassland site of Lake Ginninderra (BE06).

3.2.2 Licences

The ACT Planning and Land Authority grants licences under the *Planning and Development Act 2007* (ACT) to occupy or use unleased Territory Land. Licences must be in writing and

[44] *Planning and Development Act 2007* Section 332 (2)(a).

[45] *Planning and Development Act 2007* Section 332 (2)(b).

[46] Action Plan No. 28.

state the period for which they are granted.[47] A licence is subject to the conditions stated in it. The ACT Planning and Land Authority must not grant a licence to occupy or use public land unless the Conservator of Flora and Fauna agrees in writing to the grant.[48]

Nine agistment licences are held over unleased Territory Land, which are grassland sites (*see* Table 4). Agistment licences are three-party licences between the ACT Planning and Land Authority, the custodian of the land, and the licencee. Three of these licences are in the nature reserves of Dunlop (BE02), Crace (GU03) and Gungaderra (GU02), which provide for grazing to be undertaken for conservation purposes only, in compliance with the licence conditions.

Agistment licences are not standardised in their conditions; for example, six of the licences can be terminated on seven days notice and the other two licences can be terminated on one months notice. None of the agistment licences contain specific provisions relating to protecting the lowland native grassland. However, all agistment licences contain a provision requiring the licensee to comply with any direction as to the maximum number and type of stock to be grazed on the land within seven days of such directions being given.

From discussions with staff in relevant agencies it seems that the time involved in administering agistment licences could be reduced if these were standardised, including termination dates and if one government agency only was the government signatory to these agreements.

Recommendation 12: Simplify administration of agistment licences covering lowland native grassland sites through standardising their conditions, including termination dates; and have one government agency signatory to an agistment lease.

3.2.3 Leases

The ACT Planning and Land Authority grants leases under the *Planning and Development Act 2007* (ACT). There are seven whole or part rural leases over lowland native grassland areas. The Authority must not grant a lease of public land unless the Conservator of Flora and Fauna has provided a written recommendation that the lease be granted. Fourteen leases are held over Territory Land on lowland native grassland sites (*see* Table 4).

Rural leases

Land management agreements are mandatory under the *Planning and Development Act 2007* (ACT) for granting rural leases, granting further rural leases, varying rural leases or consenting to transfer of a rural lease.[49] A land management agreement defines the natural values of a lease, provides a map of the land area, and describes the environmental values. It also sets out terms and conditions for maintaining or improving those values while enabling operation of a rural enterprise. The Conservator of Flora and Fauna and the rural lessee sign the rural land management agreement. Rural land management agreements are commercial-in-confidence documents. Managing land held under a rural lease, other than in accordance

[47] *Planning and Development Act 2007* Section 304(1).

[48] *Planning and Development Act 2007* Section 303(2).

[49] See section 283.

with a rural land management agreement that applies to it, is a controlled activity[50] for which enforcement action can be taken under the *Planning and Development Act 2007* (ACT).[51]

Confusion between some Department of Territory and Municipal Services and ACT Planning and Land Authority staff is apparent over who is accountable for administering Land Management Agreements that support rural leases. The process for administering leases (including land management agreements) is complex and involves both Territory and Municipal Services and ACT Planning and Land Authority staff. This complexity may have led to confusion regarding accountability for enforcement of the conditions in the Land Management Agreement for 'Cookanalla' (*see* Recommendation 15). Given the role of Parks Conservation and Lands (Department of Territory and Municipal Services) it seems appropriate for them to be fully responsible for administering land management agreements.

Recommendation 13: Ensure rural lease processes (including those for land management agreements) are simplified and responsibilities are clarified.

The Commissioner and staff, in the company of Dr Hodgkinson, met with most rural lessees who had a rural lease with a lowland native grassland site and participated in an inspection of their leasehold properties. All the rural lessees were cooperative during the course of the investigation and provided a copy of their rural land management agreements on a confidential basis.

The land management agreements all contain provisions that aim to protect the grassland sites and the threatened species they contain; for example, requirements relating to grazing, weed control and fertiliser use. Each contains a provision that the agreement will be reviewed no later than at five-year intervals.

Parts of Crace Nature Reserve (GU03) and Caswell Drive (BE10) have rural leases that are managed under land management agreements. Given that these land management agreements have not been reviewed within the required five-year period and these sites are in a critical condition, a review of the conditions in the land management agreements is needed. Once this is done, compliance with the conditions in the land management agreement should be monitored to ensure their implementation.

Recommendation 14: Review the land management agreements covering Crace Nature Reserve (GU03) and Caswell Drive (BE10).

One grassland site on a leasehold property, 'Cookanalla' (JE08), was approaching a critical threshold beyond which unacceptable degradation would occur because of grazing and weeds. The rural land management agreement for this property is due for review by August 2009 at the latest. In the interim, this rural land management agreement contains provisions and conditions that can be used to regulate grazing and weed control. Enforcement of the provisions and conditions should occur immediately.

It is of concern that the 'Cookanalla' (JE08) site, a rural lease, has reached its current degraded state without action being taken by the relevant government department to enforce compliance with the conditions in the Land Management Agreement, which is part of its rural lease.

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[50] Section 339 and Schedule 2 Item 6.

[51] See sections 352 to 361.

Recommendation 15: Immediately enforce the provisions and conditions in the land management agreement, which is a part of the rural lease for 'Cookanalla' (JE08).

Conditions in land management agreements (attached to rural leases) are potentially a powerful mechanism for protecting lowland native grassland areas on leased rural land. However, for their benefit to be realised the conditions must be implemented. Accordingly, the government department responsible for administrating land management agreements needs to monitor compliance and take enforcement action if needed. In this investigation no information was available that indicated that any action had been taken to monitor compliance with, or enforce conditions in the land management agreement for 'Cookanalla' (JE08), a site that needs land management actions to restore its ecological conditions.

Recommendation 16: Foster a strong culture of compliance, monitoring and enforcement within the government department responsible for administering land management agreements.

Land management agreements need to be monitored and assessed in order to ensure the required on-the-ground actions are achieving the desired ecological results. There was no evidence of a formal monitoring, assessment or auditing process being in place. Furthermore, information from such a process could be used to help the ACT Government's Flora and Fauna Committee advise on policy issues and monitor implementation of the ACT Government's, 2005 *A Vision Splendid of the Grassy Plains Extended: ACT Lowland Native Grassland Conservation Strategy*, Action Plan No. 28.

Recommendation 17: Establish a formal monitoring, assessment and auditing process aimed at ensuring conditions in land management agreements achieve the desired ecological results.

Grazing is an important land management tool currently used to control grassland biomass. However, if this is used inappropriately it can adversely affect the lowland native grassland ecology. Grazing should, therefore, be undertaken as part of the conservation management strategy within an adaptive management process to protect lowland native grassland sites.

Recommendation 18: Permit grazing under rural leases and licences, on lowland native grassland sites if it is part of a long-term conservation management strategy.

Other leases

Currently, there are seven non-rural leases on lowland native grassland sites in the ACT. These non-rural leases are not required to have land management agreements. These non-rural leases are:

- Caravan park and camping ground – 'Callum Brae' (part JE02)
- Model Aircraft Club – 'Callum Brae' (part JE02)
- Telecommunications – Gungaderra Nature Reserve (GU02)
- Print Handicapped Radio – Gungaderra Nature Reserve (GU02)
- Canberra Riding Club (GU06)
- Church purposes – St John's Church, Reid (CC03)
- Religious purposes – Australian Centre for Christianity and Culture, Barton (CC04).

No specific management arrangements appear to be in place for these leases except for the Australian Centre for Christianity and Culture, Barton (CC04). This grassland site straddles two leasehold areas occupied by the Australian Centre for Christianity and Culture and St Mark's Anglican Church. Both leases contain a requirement that a conservation management plan be developed for the Natural Temperate Grassland on the site. Parks Conservation and Lands, in consultation with the lessees, has developed a draft Conservation Management Plan and Specifications for the site.[52]

While the Department of Territory and Municipal Services can request that a land management agreement is completed before a lease is granted this cannot be done retrospectively.[53] Therefore, for all these sites it is recommended that annual site operation plans be developed, as stated in Recommendation 10.

3.2.4 Unleased Territory Land

Unleased Territory Land includes roadsides and other areas for which leases have not been developed, such as the undeveloped industrial land at Mitchell (GU05) and AMTECH (JE09). Other unleased Territory Land, while managed by the ACT Government, is not required to have statutory management plans. In many cases, there are no existing conditions for use that ensure consideration of conservation issues. However, Roads ACT in consultation with Parks Conservation and Lands has developed the Roadside Management Plan to define responsibility between agencies and also identify areas of conservation value. In addition, the Bushfire Operational Plan for each financial year is sent to relevant agencies. These plans allow for inclusion of certain provisions in activities that may affect conservation issues. To help manage these sites, it seems prudent that the annual site operation plans be developed for unleased Territory Land with lowland native grassland sites. Therefore, for all these sites it is recommended that annual site operation plans be developed, as stated in Recommendation 10.

3.2.5 Conservator's Directions

The *Nature Conservation Act 1980* (ACT) provides for the Conservator of Flora and Fauna to issue directions to the lessee relating to protection of significant natural values. To ensure protection of Grassland Earless Dragon habitat, the Conservator of Flora and Fauna issued Conservator's Directions relating to the grassland sites on leasehold land at Harman Bonshaw North (JE07) and 'Cookanalla' (JE08) issued in January 2004; and 'Callum Brae' (JE02), Jerrabomberra West Reserve (JE03), and Harman Bonshaw South (JE06) issued in February 2004. These Directions came into effect 14 days from the date of issue. Failure to comply with a Conservator's Direction is an offence under section 60(3) of the *Nature Conservation Act 1980* (ACT).

These Directions were superseded by land management agreements. However, as previously mentioned, the conditions in these land management agreements do not appear to be subject to compliance monitoring and enforcement, when appropriate.

[52] Pers. comm., Sarah Sharp, Parks Conservation and Lands.

[53] Email from Sharon Harmer, ACT Planning and Land Authority, 13 January 2009.

4 Management issues

Natural Temperate Grassland is considered endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) and the *Nature Conservation Act 1980* (ACT). This is due to the severe decline in its extent, the fragmented distribution and isolation of many remaining sites, and modification of the community composition, structure and ecological processes.[54]

Following European settlement, a number of factors have been responsible for the loss of grassland and modification of the remnants. These factors generally remain as ongoing threats. The major threats to the lowland native grassland as identified in the National Recovery Plan and Action Plan No. 28 are:

- pastoral and agricultural development
- urban and infrastructure development
- weed invasion
- changes in or inappropriate fire regimes
- other forms of disturbance including:
    - inappropriate grazing regimes
    - physical disturbance
    - use of fertilisers and other soil ameliorants
    - mowing and slashing
    - tree planting
    - herbicide use
    - collection of grass seed.

The changes that have occurred to the grasslands since European settlement need to be considered when applying management to sites. In particular, the loss of many areas of grassland has resulted in extensive fragmentation, thus causing isolation of species with, in many cases, minimal or no opportunities for re-colonisation following local extinction. The modifications to grassland has resulted in:

- elevated nutrient levels
- increased soil acidity
- increased soil compaction
- loss of topsoil
- changes to drainage
- loss of native species diversity (including soil biota and digging mammals such as bettongs and bandicoots).

[54] National Recovery Plan, page 21.

4.1 Threatening processes currently impacting grassland sites

Dr Hodgkinson undertook an assessment (from February to August 2008) of the key threatening processes impacting the Territory's lowland native grassland sites.[55] Threats assessed were grazing, mowing / slashing, lack of fire, significant weed invasion and physical disturbance. He also consulted the relevant Commonwealth land managers and the Department of Territory and Municipal Services land managers and staff, rural lessees, particularly in relation to historic events, past management, and survey results.

The threatening processes and condition of each lowland native grassland site are presented in Table 5. Using a critical threshold analysis (a point at which one or more threats will cause irreversible damage to a site, beyond which native plant and animal survival and reproduction is compromised)[56] each site's condition has been classified as:

- Good (**G**) – these sites require ongoing management.
- Approaching a Critical (**AC**) threshold – these sites require urgent management action.
- Critical (**C**) threshold – these sites require urgent management action.

As shown in Table 5, the threatening processes for sites classified as approaching a critical threshold (**AC**) or at critical threshold (**C**), were:

- weed invasion on 14 sites
- overgrazing by kangaroos on 11 sites
- overgrazing by rabbits on four sites
- overgrazing by stock on seven sites
- inappropriate mowing on five sites
- lack of biomass management (that is, closed canopy) on eight sites.

The conservation significance of a site needs to be considered with respect to that site's ecological classification (*see* Table 1). Sites in the highest Conservation Category (Category 1: Core Conservation Sites)[57] should be given priority for action over sites in other categories.

An analysis of Table 5 shows that of the Territory's 49[58] lowland native grassland sites:

- Twenty (40%) are in good condition.
- Twenty (40%) are approaching a critical threshold.
- Ten (20%) are in a critical condition.

[55] 49 sites were assessed with Lawson Commonwealth (BE08) site being assessed as two separate areas being Belconnen Naval Transmission Station (BE08(a) (the area behind the secure fence) and Lawson Commonwealth – East (BE08(b) (the area outside the secure fence). Harmon Bonshaw North (JE06) and Harmon Bonshaw South (JE07) were assessed as one site.

[56] Ken Hodgkinson, report to the Commissioner for Sustainability and the Environment.

[57] Action Plan No. 28, page 57.

[58] Lawson Commonwealth land (BE08(a) and BE08(b)) was considered in two sections with each being rated differently. Hence the summary totals 50.

The main threat to the lowland native grassland in the Majura Valley (all sites are in Category 1: Core Conservation Sites, except 'Malcolm Vale' (MA04)) is overgrazing by kangaroos. Sites in the Majura Valley that are not in critical condition due to overgrazing, most notably Canberra International Airport ((MA03), which is in good condition, have generally been fenced for a considerable time, hence preventing kangaroo grazing. This good condition is also due to the overall effective management that takes place at Canberra International Airport. Overgrazing by kangaroos is also an issue for some sites in Jerrabomberra, Gungahlin and Belconnen.

Weeds and inappropriate mowing regimes were the main threatening process for sites in the urban areas of Central Canberra / Tuggeranong.

Dr Hodgkinson's full report is in Appendix 8 and a summary of all the lowland native grassland sites is in Appendix 4.

4.2 Conservation management requirements

Management is required to maintain the optimal composition, structure and function of lowland native grassland ecosystems to reduce its vulnerability to threatening processes. The optimal condition of lowland native grassland includes:

- dominance by vigorous native perennial grasses
- presence of inter-tussock spaces that provide habitat for smaller less vigorous native forbs[59]
- a diversity of native grasses and forbs
- opportunities for plants to flower and set seed and regeneration to occur.[60]

The resulting high diversity of structure and composition is considered essential to provide habitat for a range of fauna species. In addition, it will result in improved resistance to weed invasion, a healthy soil biota that is important for functioning, and a reduction in soil disturbance and water erosion.[61]

4.2.1 Management of biomass

A mix of tall tussock and shorter inter-tussock species is important for conserving a range of grassland plants and animals. In the absence of some form of removal of excess foliage (defoliation or biomass reduction) the dominant grasses tend to become overgrown and rank, and the result is a loss in the heterogeneity of structure and biological composition and subsequent reduction in habitat diversity. The consequence of protecting grassland from all processes of defoliation is an elevated risk that native plant species and many fauna species will be lost from the site.

[59] Forbs are a group of non-woody plants, other than grasses, sedges and rushes.

[60] Action Plan No. 28.

[61] Pers. comm., Sarah Sharp, Parks Conservation and Lands.

Table 5: Threatening processes and condition of lowland native grassland sites in the ACT, as assessed by Dr Ken Hodgkinson in mid 2008

Site name	Site no.	Land ownership	Stock grazing	Kangaroo grazing	Rabbits	Weed invasion	Mowing	Physical disturbance	Closed canopy	Condition
Majura Valley										
Majura Training Area	MA01	N		P		#				C
Air Services Beacon	MA02	N							#	G
Canberra International Airport	MA03	N				#				G
'Malcolm Vale'	MA04	N		P		P				C
Campbell Park	MA05	N				#				G
Majura West	MA06	T	P	P	P					C
Jerrabomberra Valley										
'Mugga Mugga' Homestead	JE01	T								G
'Callum Brae'	JE02	T				#				G
Jerrabomberra West Reserve	JE03	T				#				G
Woods Lane	JE04	T						#		G
Jerrabomberra East Reserve	JE05	T		P		#				AC
Harman Bonshaw South	JE06	N&T				P				AC
Harman Bonshaw North	JE07	N&T				P				AC
'Cookanalla'	JE08	T	P		P	P				AC
AMTECH	JE09	T				#				G
Tennant Street, Fyshwick	JE10	T				#				G
Gungahlin										
Mulanggari Nature Reserve	GU01	T								G
Gungaderra Nature Reserve	GU02	T				#				G
Crace Nature Reserve	GU03	N&T	P	P	P	P				C
North Mitchell	GU04	T								G
Mitchell	GU05	T							P	G
Canberra Riding Club	GU06	T	P							AC

Site name	Site no.	Land ownership	Stock grazing	Kangaroo grazing	Rabbits	Weed invasion	Mowing	Physical disturbance	Closed canopy	Condition
Wells Station Road	GU07	T				P				AC
Nicholls	GU08	T				P				AC
Belconnen										
Ginninderra Experimental Station	BE01	N		P						C
Dunlop Nature Reserve	BE02	T	P	P						C
'Jarramlee'	BE03	T	P	P	P					C
Umbagong Park South, Florey[a]	BE04(a)	T							P	AC
Umbagong Park North, Florey[a]	BE04(b)	T				P			P	AC
Evatt Powerlines	BE05	T				#				G
Lake Ginninderra	BE06	T						#		G
Lawson Territory	BE07	T	P			P				AC
Lawson Commonwealth (Belconnen Naval Transmission Station)[b]	BE08(a)	N		P						C
Lawson Commonwealth (East)[b]	BE08(b)	N				#			#	G
Kaleen east paddocks[c]	BE09	T				#				G
Caswell Drive	BE10	T		P						C
Glenloch Interchange	BE11	T								G
Kama South	BE12	T								G
Evatt Footbridge	–	T							P	AC
Central Canberra/Tuggeranong										
CSIRO Headquarters, Campbell	CC01	N&T		P						C
Constitution Avenue, Reid	CC02	T							P	AC
St John's Church, Reid	CC03	T				#			#	G
Australian Centre for Christianity and Culture, Barton	CC04	N&T							P	AC
York Park, Barton	CC05	N				P				AC
Yarramundi Reach	CC06	N				P			P	AC

Site name	Site no.	Land ownership	Stock grazing	Kangaroo grazing	Rabbits	Weed invasion	Mowing	Physical disturbance	Closed canopy	Condition
Lady Denman Drive, Yarralumla	CC07	N&T				P	P			AC
Dudley Street, Yarralumla	CC08	T				P	P			AC
Guilfoyle Street, Yarralumla[d]	CC09	N				P	P			AC
Novar Street, Yarralumla	CC10	T					P			AC
Black Street, Yarralumla	CC11	T					P			AC
Isabella Pond, Monash	TU01	T							#	G

Notes:

N = National Land; T = Territory Land; N&T = National and Territory Land; P = present on site; # = Minor ongoing management required, site otherwise in good condition.

Threatening processes are grazing, weed invasion, mowing, physical disturbance and closed canopy.

Condition is identified as:

AC = approaching a critical threshold

C = at a critical threshold: A critical threshold is identified as being a point at which one or more threats will cause irreversible damage to a site, beyond which native plant and animal survival and reproduction is compromised (Ken Hodgkinson, report to the Commissioner for Sustainability and Environment). Sites identified as being in a critical condition or approaching a critical threshold require immediate action.

G = in good condition

a This site is identified as one site in Action Plan No. 28.

b This site is identified as one site in Action Plan No. 28.

c Fireweed removed after inspection.

d This site is incorrectly named as Kintore Street in Action Plan No. 28

The amount of defoliation needed relates to the productivity of the site and the growth forms of the dominant grass species. Where tall species, such as River Tussock (*Poa labilliardieri*) or Kangaroo Grass (*Themeda triandra*), dominate a lack of defoliation leads to development of a dense mat of vegetation material, which inhibits the growth and development of other plant species with consequent effects on fauna habitat. Where low-growing species dominate, minimal defoliation reduction may be needed to maintain the diversity of species and heterogeneity of habitat.[62] Any management should be applied as a mosaic, with only part of a site affected by defoliation at a time. This will increase heterogeneity of habitat and provide refuge when biomass is low.[63]

The three main forms of removal of foliage that can be applied are fire, slashing and mowing, and grazing.[64] While all three options can achieve good ecological outcomes, all are influenced by changes that have occurred since European settlement and can in some ways negatively affect the grassland habitat.[65]

Action Plan No. 28 describes the issues related to using these practices to achieve conservation outcomes in detail in Sections 3.7 and 2.1.7. However, Action Plan No. 28 fails to address overgrazing by kangaroos as an issue as no such threat was perceived at the time the strategy was produced in 2005. Consequently the issues related to kangaroo grazing are dealt with in some detail in this report.

Fire

While not researched fully, it is generally believed that fire enhances diversity to a greater extent than grazing or mowing.[66] Both grazing and slashing are more likely to introduce weeds into a site, or to spread them within a site. Fire has been an integral part of the evolution of native grasslands and is used as a management tool to maintain plant diversity. For many grassland sites, application of occasional burns is probably the optimal management regime to achieve conservation outcomes.

If burning is to be used as a management tool the following factors need to be considered (*see* Action Plan No. 28 for more detail):

- **Timing**: Plants need to be able to flower and set seed to regenerate. Some grassland species may require fire to enhance germination. It is likely that the most optimal period for burning is late summer or early autumn, although winter burns (if a fire can be carried at that time) may enhance growth of native grasses.
- **Intensity**: High intensity fires may affect soil biota including lichens and mosses (cryptogams), which are important for functional purposes of water absorption, nutrient cycling and maintenance of soil structure.
- **Frequency**: While research undertaken in Victoria in productive Kangaroo Grass dominated sites recommended a fire interval of between three and five years, the intervals should be assessed based on biomass density. Fires should only be applied when the biomass is high and structural heterogeneity is reduced, rather than at a fixed interval. It is considered that in the ACT sites it is more likely that an interval of

[62] Action Plan No. 28.

[63] Action Plan No. 28.

[64] Action Plan No. 28.

[65] Action Plan No. 28.

[66] Pers. comm., Sarah Sharp, Parks Conservation and Lands, 21 October 2008.

between four and 10 years would reflect actual biomass accumulation and sustain populations of a range of species.

- **Fauna impacts**: Patch burning (mosaics) is recommended to minimise risk to animals during a fire and to provide habitat before regeneration occurs. The size of the patch should relate to the taxonomic group of animals that are of most concern, or that required for ongoing survival by the largest animals of concern.

  There is considerable debate about the effects of regular burns (as opposed to occasional wildfire) on grassland fauna. In particular in fragmented sites there is limited or no opportunities for repopulation from neighbouring areas if animals are killed due to fire or other impacts. It is important to look at the ecology of each species (or threatened species as indicator species) to determine when they are least vulnerable to the immediate (heat, flame and smoke) and short-term (loss of vegetation cover and food resources) effects of fire.

- **Firebreaks** may need to be established to prevent the accidental spread of fire from or into a grassland site. This may require a mown strip. Ploughing or spraying will only spread or introduce weeds. Where possible such firebreaks should be outside the lowland native grassland site (for example, on a roadside or adjacent developed block).

- **Weed infestation** needs to be considered when applying burns. Bare ground resulting from the fire provides an optimal bed for establishment of weeds from seed store or from seeds arriving onto the site. The subsequent management of such weeds needs to either be incorporated into the program or the timing needs to be reconsidered. Of particular concern is the invasive capability of major weeds, such as African Lovegrass and Chilean Needlegrass, after a fire. Fire may also be an optimal approach to reducing some annual weeds, if they are burnt before setting seed. To minimise weed spread vehicles controlling the fires that enter the site need to be cleaned before entry.

Parks Conservation and Lands has produced an internal report that summarises known current information about the impact of fire and fuel reduction operations on threatened species and some ecological communities (including Natural Temperate Grasslands). These guidelines will aid development and implementation of annual Bushfire Operational Plans.

In addition, practical considerations to applying conservation burns on the lowland native grassland sites need to be considered. Such considerations include:

- restrictions to the seasons in which burns can safely occur
- restriction of suitable days as a result of fire hazard considerations and air pollution
- cost and availability of approved personnel and equipment
- risk of too frequent burns when used as control burns to protect adjacent property
- community concern about amenity.

Dr Hodgkinson visually assessed sites as requiring a burn by the degree of canopy closure. If the canopy was generally closed he judged the site to be approaching a critical threshold beyond which lack of fire to open the canopy would inhibit reproduction and establishment of forbs. He has advised that:

- species in grassland communities are adapted to fire and may require prescribed fire to persist
- there is a need to develop a fire management plan for each site and allocate resources

to conduct environmental burns

- the following sites should be considered for burning:
    - Air Services Beacon (MA02); Constitution Avenue, Reid (CC02); St John's Church, Reid (CC03); Australian Centre for Christianity and Culture, Barton (CC04); Yarramundi Reach (CC06); Guilfoyle Street, Yarralumla (CC09); Umbagong Park South (BE 04a); Umbagong Park North (BE 04b); Lawson Commonwealth – East (BE08(b)); Evatt Footbridge; Isabella Pond, Monash (TU01); and Mitchell (GU05).

While not researched fully, it is generally believed that fire enhances grassland diversity to a greater extent than grazing or mowing. Compared with fire, both grazing and mowing are more likely to introduce weeds into a site, or spread them within a site. However, ecological burns are not undertaken as a routine part of managing grasslands within the ACT. As the use of fire is not fully researched, and as lowland native grassland areas are primarily in or near Canberra's urban areas resulting in logistical challenges for undertaking burns, it is recommended that some experimental burns be undertaken to inform decisions about a wider use of fire.

Potential sites for consideration for an ecological burn program are: Air Services Beacon (MA02); Constitution Avenue, Reid (CC02); St John's Church, Reid (CC03); Australian Centre for Christianity and Culture, Barton (CC04); Yarramundi Reach (CC06); Guilfoyle Street, Yarralumla (CC09); Umbagong Park South, Florey (BE04a); Umbagong Park North, Florey (BE04b); Lawson Commonwealth – East (BE08(b)); Evatt Footbridge; Isabella Pond, Monash (TU01); and Mitchell (GU05).

Recommendation 19: Undertake experimental ecological burns on selected sites to determine the appropriateness of a wider application for managing lowland native grassland sites in the ACT.

Slashing and mowing

Defoliation / biomass removal by slashing or mowing is often used for landscape amenity, to improve access and to reduce fire hazard. Mowing and slashing are used on small sites, such as urban areas and cemeteries, and on roadsides where there may be small grasslands patches. However, it also has the effect of maintaining open structured grassland conducive to germination of a wide range of wildflowers associated with native grasslands. As is the case with burning or grazing, timing, frequency and intensity (slashing height) are keys to achieving a good or poor outcome.

Any slashing regime should allow for periods of good plant growth between each mowing and permit the grassland species to flower and set seed at least every few years.[67]

Slashing as a form of biomass reduction has the advantage of being highly manageable in terms of timing (it can be carried out at any time), cost (it is relatively cheap to undertake), frequency (it can be carried out at any required frequency), and selectivity (all plants are removed at the same height).

[67] Action Plan No. 28, page 76.

Slashing has three major disadvantages:

- **The spread of weed seeds on machinery**: Hygiene of slashers is important so seed is not spread between sites. Within sites weeds may be spread from infested to non-infested areas.
- **The litter it produces**: If the cuttings are not removed they can form mulch, which initially inhibits or kills the species underneath, and as it decomposes the area is often invaded by more aggressive introduced species.[68]
- **Reduction in natural regeneration**: Too frequent mowing does not allow for natural regeneration, as flower heads and / or ripening seed heads are removed. It is very likely that too frequent defoliation in many sites that have been regularly mown for decades (predominantly urban grasslands or roadsides) has led to loss of the taller species, such as Kangaroo Grass, resulting in dominance by low-growing grasses and forbs in those sites.[69]

Issues that need to be considered are:

- **Removal of thatch**: Prevent build up of mulch by using a catcher on mowers or collect and remove thatch (mower clippings) immediately after mowing.
- **Hygiene of machinery**: Machinery needs to be clean when brought onto sites and the least weedy areas should be mown first.
- **Season**: Allow for regeneration events, so generally avoid mowing within the growing season to the maturation of seed (late winter / early spring through to autumn). This may cause considerable difficulties when areas are mown for aesthetics, access, and / or fire hazard reduction.
- **Height**: Cutters should be set no lower than 10 centimetres.
- **Frequency**: Should be undertaken no more than twice a year to prevent loss of vigour and persistence of native grasses.

Dr Hodgkinson assessed sites in terms of requiring mowing / slashing based on whether it was being mowed regularly and if the grass was mown below 10 centimetres. He also considered the level of reproduction that had occurred if there was a presence of Chilean Needlegrass and / or African Lovegrass, or if native species known to be sensitive to mowing were observed. Based on these factors, he assessed whether the site was approaching a critical threshold beyond which native species were being compromised.

Dr Hodgkinson has advised that:

- mowing is threatening the functioning and integrity of some of the grassland sites
- urban mowing practices need to be reviewed in the short term at all lowland native grassland sites where mowing occurs.

He identified the following sites as approaching a critical threshold as a result of inappropriate mowing:

- Lady Denman Drive, Yarralumla (CC07); Dudley Street, Yarralumla (CC08); Guilfoyle

[68] Action Plan No. 28, page 76.

[69] Pers. comm., Sarah Sharp, Parks Conservation and Lands.

Street, Yarralumla (CC09); Novar Street, Yarralumla (CC10); and Black Street, Yarralumla (CC11).

All threatening processes that require urgent action to be taken, relative to each site, are the subjects of Recommendation 21.

Grazing

Of concern for this investigation are the environmental impacts of excessive grazing pressure on lowland native grasslands, which results in both degradation of the natural integrity of these grasslands and loss, and degradation of habitat critical to threaten species of these grasslands. All native grasslands are affected by grazing by mammals and invertebrates, but the effect depends on its timing, selectivity, intensity and duration. Total grazing pressure from all major herbivores, including kangaroos, rabbits, horses, sheep and cattle should be taken into consideration.[70] In addition, grazing by livestock, kangaroos and rabbits has differing effects on the grasslands; for example, grazing by sheep is considered to be more destructive than by cattle and the selection of fodder of kangaroos is different to that of livestock.[71]

Action Plan No. 28 identifies grazing as capable of having both major positive and negative impacts on the ecological integrity and function of the lowland native grasslands. The effects depend on factors such as the circumstances and attributes of particular sites and the intensity and duration of the grazing.

Sustained heavy grazing pressure can lead to deleterious impacts on native grasslands for habitat, whether it is caused by domestic stock, kangaroos or feral herbivores. Overgrazing is of particular concern where impacts affect the endangered Natural Temperate Grassland community or other grassland that provides habitat for threatened flora and fauna. This is because any reduction in the suitability or quality of their habitat places them at a higher risk of extinction.[72] For this reason the Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)) was the first site investigated.

Grazing by livestock

As native grasslands have evolved under grazing by native herbivores, grassland ecologists consider removal of grazing altogether to be detrimental to the grassland (where it is currently occurring) unless replaced by an alternative form of biomass reduction. Thus native grasslands lightly or moderately grazed by kangaroos or livestock in general will be in better condition than native grasslands that are not grazed (or burnt) for a long time.

However, grazing by stock and development of associated infrastructure (fencing, watering points, tracks and stock yards) over the past 200 years has caused significant impact on the composition and structure of grasslands. The effects are:

- soil compaction and erosion, especially along tracks, near watering points and yards,

[70] Action Plan No. 28.

[71] Report from Parks Conservation and Lands to the ACT Commissioner for Sustainability and the Environment for the Inquiry into the Management of Lowland Native Grasslands, Parks Conservation and Lands, August 2008.

[72] Report from Parks Conservation and Lands to the ACT Commissioner for Sustainability and the Environment for the Inquiry into the Management of Lowland Native Grasslands, Parks Conservation and Lands, August 2008.

and pugging[73] after rain and at open watering points

- selection pressures on more palatable species, leading to reduction or loss of some species), and increase of others (weeds and disturbance tolerant native species
- loss of taller plants and subsequent replacement by short species that set seed at a lower height (particularly the loss of Kangaroo Grass and replacement by smaller wallaby grasses and the less palatable spear grasses)
- increase in nutrients, particularly around stock camps and as a result of addition of superphosphate
- introduction of weeds through animal dung, on animal hides, through introduction of weed-infested feed, on vehicles and through cropping.

Grazing can be used to manipulate both structure and composition to achieve conservation outcomes. An advantage of using livestock grazing for biomass reduction is the ease by which domestic stock can be moved on and off sites, allowing a site to be rested or destocked, which in turn maintains heterogeneity of structure and provides opportunities for regeneration of desired plants and control of undesired plants.

Considerations include:

- **Timing**: Allow for maintenance of native plants through replenishment of root reserves and regeneration of new plants. Remove grazing during flowering and maturation of seed.

  Grazing can occur at any time and is not dependent on the condition of the foliage, though grazing generally occurs when plants are actively growing and providing the highest levels of nutrients to livestock. However, grazing can still occur in less than optimum periods, to achieve a particular effect on the herbage mass or control particular species' growth or seed-set (such as annual weed control), as long as animal welfare considerations are taken into account.[74]

- **Selectivity**: Light grazing pressure over long periods encourages selectivity of more palatable plants, while very short periods of grazing by high numbers of stock will encourage more even grazing pressure overall. However, grazing may be used to encourage selectivity by, for example, allowing grazing while weeds are most palatable.
- **Intensity and duration**: These follow from the two previous issues, to optimise the ability to move stock easily on and off sites to control the amount of biomass removed and the selectivity of species that are grazed.
- **Weed control**: Ensure animals are free of weed (including in dung) before entering a site; do not enhance feed on site to minimise introduction of weeds; use grazing to control weeds while palatable to reduce their vigour and / or seed set.

To achieve optimal conservation outcomes, grazing should be undertaken over very short periods with a high number of animals to minimise selectivity and then allow for long periods of recovery.

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[73] Pugging occurs when stock intensively tramples and compacts wet soil. The results include poor drainage and plant growth, greater fertiliser need, and increased topsoil and contaminant runoff to waterways.

[74] Report from Parks Conservation and Lands to the ACT Commissioner for Sustainability and the Environment for the Inquiry into the Management of Lowland Native Grasslands, Parks Conservation and Lands, August 2008.

Dr Hodgkinson has advised that there is a need to reduce or cease stock grazing at:

- Dunlop Nature Reserve (BE02), 'Jarramlee' (BE03), Lawson Territory (BE07), Crace Nature Reserve (GU03), 'Cookanalla' (JE08), Majura West (MA06), and Canberra Riding Club (GU06) (horses).

All threatening processes that require urgent action to be taken, relative to each site, are the subjects of Recommendation 21.

Grazing by rabbits

The herbage mass removed by rabbits may be insignificant compared to that removed by livestock or kangaroos, but the effect of their digging and establishment of burrows may be considerable. As a result of their selective grazing, rabbits are known to have significant effects on particular native species. Rabbits have a strong preference for smaller and more succulent plants and plant parts, which are frequently native herbs, including lilies and orchids, thus targeting species not usually selected by domestic stock or kangaroos.

Dr Hodgkinson has advised that the selective grazing by rabbits is a particular problem in:

- Dunlop Nature Reserve (BE02), Crace Nature Reserve (GU03), 'Cookanalla' (JE08), and Majura West (MA06).

However, from observation and discussions with land managers it is an emerging problem across all sites.

All threatening processes that require urgent action to be taken, relative to each site, are the subjects of Recommendation 21.

Grazing by kangaroos

Kangaroos occur, often in high densities, throughout much of the ACT, including areas protected primarily for conservation of grassy ecosystems. Monitoring indicates kangaroo densities are considerably lower on rural leases where culling occurs.[75] Examples include:

- Majura Training Area (MA01) and Majura West (MA06), where sustained heavy grazing by kangaroos over several years has removed almost all of the grassland vegetation, leaving mostly bare ground in an area of endangered Natural Temperate Grassland, which is also habitat for threatened species such as the Grassland Earless Dragon, Striped Legless Lizard, Golden Sun Moth and Perunga Grasshopper that depend upon grassland cover.
- Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)), where heavy grazing led to concerns that the Natural Temperate Grassland and associated species were at the point of being deleteriously impacted. The subsequent cull that occurred at the site has significantly reduced that pressure.
- Crace Nature Reserve (GU03) and Dunlop Nature Reserve (BE02) are sites where the overgrazing of kangaroos is a land management problem.

In the grassland areas, uncontrolled kangaroo population growth, and therefore grazing pressure, is likely to be inconsistent with conservation objectives. In the longer term, it can be expected that kangaroo population increases will be at the expense of other species,

[75] Report from Parks Conservation and Lands to the ACT Commissioner for Sustainability and the Environment for the Inquiry into the Management of Lowland Native Grasslands, Parks Conservation and Lands, August 2008.

including their long-term survival. Monitoring of population numbers also indicates that kangaroos have an enormous capacity for population recovery after drought.[76] For this reason grazing by kangaroos has emerged as a key issue to be addressed for the long term management of the lowland native grassland and is an important issue considered in this investigation.

There has been a significant change in abundance of kangaroos during the last half century. For example, the Tidbinbilla grasslands, which now support more than 500 kangaroos per square kilometre,[77] had none in 1963, according to the first employees of the Tidbinbilla Fauna Reserve.[78] Crace Nature Reserve (GU03) at Gungahlin had approximately 18 kangaroos in 2002 and in September 2008 it had about 124. Such increases are rarely linear. On the current pattern, the Crace kangaroo population will reach 250 in only three years if not controlled.

The main habitat for kangaroos in the ACT is grasslands and grassy woodlands. Although kangaroos contribute to the experience of the 'bush capital', high populations and densities have a number of environmental, social, economic and animal welfare impacts. The ACT is unique compared with other major Australia urban areas in having populations of free ranging kangaroos within and on the margins of the urban area.[79]

Kangaroos have increased to their current levels because of:

- reduced impact by natural predators
- reduced hunting and shooting[80]
- reduction in the area over which culling can occur[81]
- reduced or eliminated competition from grazing livestock in many grasslands reserved for conservation, for example Crace Nature Reserve (GU03) and Majura Training Area (MA01).

Compounding the above is the continual reduction by development of land available for grazing, either obviously through large areas of urban expansion or through less immediately obvious development such as provision of utility services and roads.

Rangers now attend more than 1,000 roadside kangaroo incidents per year in Canberra. Accidents involving kangaroos have increased by 38%in 2006–07 (from 563 in 2005–06 to 777

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[76] Pers. comm., Lyn Hinds, 8 December 2008.

[77] Fletcher D, *Population dynamics of Eastern Grey Kangaroos and the expansion of the ACT urban footprint*, 2006, PhD Thesis, University of Canberra.

[78] ACT Kangaroo Advisory Committee 1997, 'Living With Eastern Grey Kangaroos in the ACT – public land: Third Report to the Minister for the Environment, Land and Planning', Australian Capital Territory, Canberra.

[79] ACT Kangaroo Advisory Committee 1997, 'Living With Eastern Grey Kangaroos in the ACT – public land: Third Report to the Minister for the Environment, Land and Planning', Australian Capital Territory, Canberra.

[80] In the first half of the 1900s there was little or no regulation of kangaroo shooting in the ACT. There were few kangaroos and those were persecuted severely, partly because they made holes in rabbit-proof fences; rabbits were important economically at the time. In the 1970s growing numbers of kangaroos led to a scheme by which ACT graziers received compensation payments from the government for kangaroo damage. A culling program for rural leases based on an annual licence system commenced in 1998.

[81] The combined result of the policy of not issuing licences near urban areas because of safety considerations and the expansion of the ACT urban footprint.

in 2006–07).[82] Kangaroo populations in most open space areas in and near the suburbs continue to increase. Data from ranger attendances over a 17 year period (1990–2008) indicate there has been a significant increase in the rate per car of vehicle collisions with kangaroos (collisions per 1,000 vehicles registered). From these data collision 'hotspots' have also been identified, which are roads that have the most kangaroo carcasses per kilometer of roadside. These are typically road sections with a high level of traffic flow adjacent to bush and grassland areas and include Limestone Avenue, Caswell Drive, Monaro Highway, Fairbairn Avenue, Hindmarsh Drive, Mugga Lane and Majura Lane. The cost of these kangaroo-vehicle collisions is significant, the average cost being $7,000.[83]

Taking into account ACT kangaroo populations and vegetation, maintaining a kangaroo population of about one kangaroo per hectare will facilitate herbage mass levels likely to be associated with higher groundcover and better habitat for grassland fauna.[84]

Dr Hodgkinson visually assessed each site for grazing and in so doing considered the species of herbivores present and the level of current grazing as indicated by the height of grasses, grass seed reproduction in the last growing season, inter-tussock spaces, the appearance of soil surface and presence of current erosion. The prevailing drought was taken into account. Based on his observations, he determined that the sites that had reached a critical threshold in terms of grazing pressure from kangaroos were:

- Majura Training Area (MA01), 'Malcolm Vale' (MA04), Majura West (MA06), Ginninderra Experimental Station (BE01), Crace Nature Reserve (GU03), Dunlop Nature Reserve (BE02), and 'Jarramlee' (BE03).

Two sites had been identified as being at critical thresholds, in terms of grazing by kangaroos, before Dr Hodgkinson's inspections, namely:

- Belconnen Naval Transmission Station (BE08(a)), where urgent action to control kangaroo numbers has been taken but a long period of recovery and possibly enhanced recovery will be needed.
- Majura Training Area (MA01) where removal of grazing pressure has been temporarily achieved through erection of a kangaroo enclosure fence, but this has only transferred the threat into the surrounding woodlands. A long period of recovery and possibly enhanced recovery will be needed.

Dr Hodgkinson advised that:

- kangaroo grazing is now threatening survival of some grassland sites
- there is a need to develop a kangaroo management program to reduce the number of kangaroos as soon as possible to prevent further environmental damage especially to Ginninderra Experimental Station (BE01), Dunlop Nature Reserve (BE02), 'Jarramlee' (BE03), Caswell Drive (BE10), CSIRO Headquarters (CC01), Crace Nature Reserve (GU03), 'Malcolm Vale' (MA04), Majura West (MA06), and Jerrabomberra East Reserve (JE05).

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[82] ACT State of the Environment Report 2007–08, Community Wellbeing Issues Paper, page 3.

[83] Pers. comm., Dr Don Fletcher, 10 October 2008.

[84] Report from Parks Conservation and Lands to the ACT Commissioner for Sustainability and the Environment for the Inquiry into the Management of Lowland Native Grasslands, Parks Conservation and Lands, August 2008.

- total grazing pressure is approaching critical levels at many sites in this drought period.

All threatening processes that require urgent action to be taken, relative to each site, are the subjects of Recommendation 21.

The current action needed to protect the Territory's lowland native grassland, is to immediately reduce grazing impacts from kangaroos on a number of sites that are in a critical condition or approaching a critical condition. From an animal welfare perspective the most appropriate time to cull is between March and July to avoid the time of year when a high proportion of females are supporting 8- to 12-month-old juveniles.

Some sectors of the community are likely to find removing kangaroos through humane culling at any time unacceptable. Their views are respected and their submissions to this investigation have been carefully considered; however, there is at present no practical alternative for removing large numbers of kangaroos. Given the limited time for undertaking a cull, the ACT and Commonwealth departments that are the relevant managers, were informed several months ago there would be a recommendation in this report regarding the need to remove kangaroos from some sites as a matter of urgency.

As kangaroo numbers increase there are also animal welfare issues for the kangaroos themselves. Following the kangaroo cull at Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)), data collected on the condition of the carcasses showed that:

> few of the kangaroos were in good condition and 42% of females and 56% of males had no kidney fat left (by comparison, of kangaroos culled to avert starvation at Tidbinbilla in 1997, only 8% had no kidney fat left.) More telling is that 38% of female kangaroos at BNTS (BE08(a)) and 47% of males had less than half of their marrow fat remaining, which is comparable to kangaroo samples during the most severe drought conditions ever recorded in this region. Thus, the winter of 2008 may have provided a serious threat to the survival of the kangaroos with low marrowfat had the cull been postponed.[85]

In the longer term, an active program of kangaroo management to achieve a population of one kangaroo per hectare needs to be coordinated across the ACT and New South Wales border. This will fundamentally be a culling program. Fertility control via oral delivery of immuno-contraceptives (vaccines) for broad scale interventions will not be possible for about 10 years.[86]

A Kangaroo Management Plan for the ACT is currently in preparation.[87] The purpose of this plan is to set out the approach to be adopted in managing the environmental, economic and social impacts of kangaroos in the ACT, while ensuring the welfare of the animal. Particular consideration will be given to managing grazing pressure on lowland native grasslands and grassy woodlands.[88]

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[85] Memo to Director, Parks Conservation and Lands prepared 1/10/08 by Claire Wimpenny and Don Fletcher, Parks Conservation and Lands.

[86] Pers. comm., Lyn Hinds, 8 December 2008.

[87] Pers. comm., Russell Watkinson, 6 January 2009.

[88] Pers. comm., Russell Watkinson, 6 January 2009.

The primary goals of kangaroo management in the ACT are:

- to manage viable populations of kangaroos as part of the fauna of the 'bush capital'
- to manage and minimise the environmental, economic and social impacts of those kangaroo populations on other biota, ACT residents and visitors.[89]

Recommendations of the ACT Kangaroo Advisory Committee include:

- the most appropriate way to kill large numbers of kangaroos on public land is by shooting according to the Code of Practice for the Human Destruction of Kangaroos in the ACT[90]
- lethal injection is only applicable where small numbers of animals are involved and in specific circumstances, such as a controlled environment[91]
- research to develop human alternatives to shooting, such as fertility control, needs to be encouraged.[92]

This is supported by the expert panel convened by the Office of the Commissioner for Sustainability and the Environment for the Belconnen Naval Transmission Station (BE08(a)) site that agreed that the most humane method of removing the kangaroos from this site would be through shooting.[93]

Two codes of practice relevant to culling in the ACT are:

- The *National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes* sets an achievable standard of humane conduct and is the minimum required of persons shooting kangaroos and wallabies.
- The *National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Non-commercial Purposes* sets an achievable standard of humane conduct and is the minimum required of persons shooting kangaroos and wallabies for reasons other than commercial use of kangaroo products (skins and meat).

A Kangaroo Management Plan for the ACT is currently in preparation and will be the subject of consultation.[94] While this is the case, removal of kangaroos, where needed, should not be delayed, pending adoption of this plan. Existing polices and procedures should be used to guide needed field actions. The Kangaroo Management Plan should, however, be progressed as quickly as possible to guide field and other actions in 2010 and beyond.

In developing the Kangaroo Management Plan for the ACT, as culling is the most appropriate way to reduce large numbers of kangaroos, it may be appropriate to investigate allowing kangaroo carcasses to be used rather than buried. Commercial harvesting operates under state-based management plans that are approved by the Australian Government under provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).

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[89] Pers. comm., Russell Watkinson, 6 January 2009.

[90] Kangaroo Advisory Committee 3rd report – recommendation 8.

[91] Kangaroo Advisory Committee 3rd report – recommendation 7.

[92] Kangaroo Advisory Committee 1st and 3rd reports – recommendation 9.

[93] *Addendum Report to the report on Belconnen Naval Transmission Station (BNTS) Site as part of the Investigation into the ACT Lowland Native Grasslands*, 28 March 2008 (see Appendix 2).

[94] Pers. comm., Mr Russell Watkinson, 6 January 2009.

Currently, the ACT is not a participant in the industry. Some of the proceeds from revenue sourced from sustainably using carcasses could go back into kangaroo fertility control research via a royalty. This concept requires further investigation, but is outside the scope of this investigation.

Kangaroo management fencing may be appropriate to temporarily control grazing. However, fencing should only be erected where there is an overall ecological benefit and in so doing care needs to be taken to ensure that this does not adversely affect other areas. Fencing is likely to be only a temporary means of controlling grazing pressures.

4.2.2 Weed invasion

The control of weeds is a critical component in the management of the lowland native grassland sites. All lowland native grassland sites in the ACT contain weeds. It is likely that this is a result of the past use of grasslands for agriculture, and caused by inadvertent spread of weeds on animals, stock fodder and machinery, as well as deliberate planting of agricultural plants such as Phalaris. In addition, many urban or landscape species have proven to be highly invasive. Other weed-spread pathways include introduction in landscape material and topsoil, discarded garden refuse, spread by wind or water, and recreational users such as bush walkers or recreational vehicles.[95] The stored seed of introduced species present in soils in grasslands is very high, which results in a continuous stock of seed available for further regeneration.

Weeds have a high impact on the Territory's economy and environment, and are recognised as being one of the most significant threats to biodiversity in the ACT. Weeds displace native species, reduce habitat quality, modify vegetation structure and alter ecological functions. In economic terms, weeds increase the cost of management programs, result in a loss of agricultural productivity and impair landscape function. Some weeds also constrain recreational access and use and harbor animal pests.[96] Many weeds also increase fire hazard, in particular annual grasses, African Love Grass and shrubby woody species that can increase fire intensity and height of flames. It is expected that the predicted changes in temperature and rainfall caused by climate change will result in changes in weed threats, with new weed introductions likely to occur. It is suggested that ecosystems are likely to be more resilient to the threats of weeds under such changed conditions if the natural functioning is maintained.[97]

Weeds that are a particularly severe threat to the grassland due to their high level of aggressive invasion are the perennial species of Serrated Tussock (*Nassella trichotoma*), Chilean Needle Grass (*Nassella neesiana*), both of which are Weeds of National Significance, African Love Grass (*Eragrostis curvula*) and St John's Wort (*Hypericum perforatum*). These species are highly invasive and can become extremely dense.

Systematic surveys of Chilean Needle Grass in grassland sites along roadsides and adjacent to other areas of high conservation areas has indicated that the species is spreading within sites and between sites. In 2002 minimal Chilean Needle Grass was found in Gungahlin, whereas surveys along roadsides in 2008 indicate it has spread along roadsides and has

[95] ACT Weeds Strategy 2007–17, ACT Government 2007.

[96] ACT Weeds Strategy 2007–17, ACT Government 2007, Chapter 2.

[97] ACT Weeds Strategy, 2007–17.

reached Horse Park Drive. As a result of this survey, Parks Conservation and Lands has undertaken an intensive spraying of the species near Mulligan's Flat Nature Reserve.[98]

Many other weed species also occur in grasslands, and are of varying levels of threat to ecosystem structure, function and habitat. The degree of impact that particular weeds may have is often variable in different sites, depending on the past land uses and disturbance in the sites. Most weeds are annual or biennial grasses or forbs that are not a problem if their numbers are kept low,[99] through minimising soil disturbance and maintaining native grass cover.

Woody weeds have also invaded into grasslands. Briar Rose is the most common woody weed, followed by Hawthorn, Blackberry and urban escapees including Cotoneaster, Radiata Pine and African Boxthorn.

The aim of weed management should be to reduce populations of the most invasive weeds present, rather than all exotic species. Mechanisms for weed control include hand weeding, strategic grazing, slashing, burning, and herbicide application. At the same time, all of these mechanisms can result in an increase in weeds, by creating bare ground, spread of weeds on animals and on machinery.

A key aspect of weed control is to avoid management activities that facilitate introduction or expansion of weeds, such as too frequent burning, addition of nutrients, exposure of bare ground, soil disturbance and / or using machinery that has not been cleaned.[100]

The ACT Weeds Strategy provides a focused approach to coordinate weed control on all sites in the Territory and to encourage collaboration between all land managers in the ACT and regionally. Membership of the group includes all Territory and Commonwealth land managers as well as the ACT Rural Lessees Association. All members of this government-instigated group have committed themselves to be guided by the ACT Weeds Strategy. The Weeds Working Group (and recently an additional group, the Weeds Advisory Group) has been overseeing control of weeds on 'conservation sites' according to a list provided by Parks Conservation and Lands and has given high priority to weed control in these sites, whether they are in a reserve or not. Significant effort has been made to reduce Serrated Tussock at Jerrabomberra West Reserve (JE03) following declaration of the site as a nature reserve, and Chilean Needle Grass at Crace Nature Reserve (GU03).

Dr Hodgkinson visually assessed sites for weed invasion and considered whether weeds were present and if they were the degree to which they had invaded the sites. If weeds were becoming dominant he considered the site was approaching a critical threshold beyond which the density of weeds would compromise native plant survival and reproduction. He made this judgment with the understanding that weeds may remain at low densities for a long time but then irrupt because of changed climate and / or disturbance.

Dr Hodgkinson advised that weeds are a threat to many grassland ecosystems and that management of weeds in the short term should be reviewed and an assessment made of the appropriateness of the level of resources allocated to their control.

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[98] Pers. com., Mr Steve Taylor, Parks Conservation and Lands.

[99] Action Plan No. 28, page 78.

[100] Action Plan No. 28, page 78.

He identified the following sites as approaching a critical weed threshold:

- York Park, Barton (CC05); Yarramundi Reach (CC06); Lady Denman Drive, Yarralumla (CC07); Dudley Street, Yarralumla (CC08); Guilfoyle Street, Yarralumla (CC09); 'Malcolm Vale' (MA04); Umbagong Park North, Florey (BE04(b)); Lawson Territory (BE07); Wells Station Road (GU07); Crace Nature Reserve (GU03); Nicholls (GU08); Harman Bonshaw South (JE06); Harman Bonshaw North (JE07); and 'Cookanalla' (JE08).

All threatening processes that require urgent action to be taken, relative to each site, are the subjects of Recommendation 21.

Two of the most threatening processes that usually affect lowland native grassland sites in the ACT are insufficient weed control and inappropriate mowing regimes (*see* Appendix 10).

Recommendation 20: Give priority to weed management and implementing appropriate mowing practices as part of routine work programs.

As already mentioned, 20% of the lowland native grassland sites are in a critical condition and 40% are approaching a critical condition. These sites need urgent management action to improve their ecological condition. This action needs to address the current threatening processes that affect the lowland native grassland sites.

Recommendation 21: Improve the ecological condition of sites that are in a critical condition or approaching this state, by reducing current threatening processes of weed invasion, inappropriate mowing and overgrazing by stock, rabbits and kangaroos as a matter of urgency, specifically:

In Majura Valley:

- Grazing pressure should be reduced by:
  - — Reducing the number of kangaroos on 'Malcolm Vale' (MA04) and Majura West (MA06). There is also a need to continue to manage kangaroos on the Majura Training Area (MA01) while not detrimentally affecting adjacent native woodland.
  - — Strategically managing (and in the short-term temporarily removing) stock and controlling rabbits on Majura West (MA06).
- Weed management controls should be enhanced on Majura Training Area (MA01) and 'Malcolm Vale' (MA04).

(Strategically located temporary kangaroo management fencing should be considered for placement around Campbell Park (MA05) and possibly parts of Majura West (MA06) if the stock and kangaroo densities in this general area are not reduced within the next six months. This is a temporary measure to protect the Grassland Earless Dragon habitat.)

In Jerrabomberra Valley:

- Grazing pressure should be reduced by:
  - — Reducing the number of kangaroos on Jerrabomberra East Reserve (JE05).

— Strategically managing (and in the short-term temporarily removing) stock and controlling rabbits on 'Cookanalla' (JE08).

- Weed management controls should be enhanced on Harman Bonshaw South (JE06) and Harman Bonshaw North (JE07).

In Gungahlin:

- Grazing pressure should be reduced on Crace Nature Reserve (GU03) by:
  - — Reducing the number of kangaroos.
  - — Strategically managing (and in the short-term temporarily removing) stock and controlling rabbits.
- Weed management controls should be enhanced on Crace Nature Reserve (GU03), at Wells Station Road (GU07) and Nicholls (GU08).

In Belconnen:

- Grazing pressure should be reduced by:
  - — Strategically managing (and in the short-term temporarily removing) stock and reducing the number of kangaroos and controlling rabbits on Dunlop Nature Reserve (BE02) and 'Jarramlee' (BE03).
  - — Reducing the number of kangaroos on Ginninderra Experimental Station (BE01).
  - — Reducing the number of kangaroos and controlling rabbits on Caswell Drive (BE10). Given the size and location of this site, it may be necessary to reduce the number of kangaroos on land in the vicinity of this site rather than concentrating only on this site
- Weed management controls should be enhanced on Umbagong Park North (BE04(b)), and in the areas of Lawson Territory (BE07) that may affect the Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)) site.

In Canberra Central:

- Weed management controls should be enhanced on York Park, Barton (CC05); Yarramundi Reach (CC06); Lady Denman Drive, Yarralumla (CC07); Dudley Street, Yarralumla (CC08); and Guilfoyle Street, Yarralumla (CC09).
- Mowing regimes should be revised to enhance grassland conservation for Lady Denman Drive, Yarralumla (CC07); Dudley Street, Yarralumla (CC08); Guilfoyle Street, Yarralumla (CC09); Novar Street, Yarralumla (CC10); and Black Street, Yarralumla (CC11).

4.2.3 Physical disturbance

Another threat to the future management of lowland native grassland sites is that of physical disturbance which includes construction of tracks, movement of machinery or vehicles in wet conditions, dumping of organic or inorganic material and erosion on sloping sites.[101]

Ploughing, earthworks that alter drainage patterns, clearing of vegetation, rock removal, cultivation, pasture improvement (fertiliser addition), excessive grazing pressure or soil

[101] Action Plan No. 28.

removal or addition all significantly compromise the integrity of lowland native grasslands and should be avoided.[102]

Dr Hodgkinson assessed sites for physical disturbance with respect to earth disturbance resulting in erosion or potential for erosion. If there was disturbance and it was significant he considered the site to be at a critical threshold or approaching a critical threshold beyond which native plant and animal species would be compromised. He considered that no sites were at a critical threshold or approaching a critical threshold as a result of physical disturbance.

[102] Action Plan No. 28.

5 Future land use and development

Areas of lowland native grassland in the ACT, are located in the Majura Valley, Jerrabomberra Valley, Gungahlin, Belconnen and parts of Central Canberra / Tuggeranong (*see* Table 6) and development is potentially a threatening process in these areas. This is in addition to the key threatening processes assessed by Dr Hodgkinson that need to be addressed by land management actions. Unfortunately, most of the lowland native grassland areas deemed suitable for conservation are also valuable development sites because they are relatively flat and usually have no or few trees. Since adoption of Action Plan No. 28, five hectares of Natural Temperate Grassland has been removed as a result of development at:

- Canberra International Airport (MA03) – four hectares to create the Brand Depot
- Caswell Drive (BE10) – one hectare as part of the Gungahlin Drive Extension roadworks.

A further 9.4 hectares of lowland native grassland at 'Callum Brae' (part JE02) has been identified for development as a long stay caravan park under the ACT Government land swap arrangement for the Narrabundah Long Stay Caravan Park.

Such development pressures on the lowland native grassland and associated endangered species highlight the difficulty the government faces in conserving ecosystems within the envelope of developable land around the ACT. A challenge for Canberra's planners and developers is to simultaneously maintain an effective balance between providing for urban development and protecting the environmental values of the urban open space and natural areas. Therefore a strategic approach is needed that simultaneously protects the lowland native grassland, in particular Natural Temperate Grass, and facilitates development.

As outlined in Section 2, both Commonwealth and ACT law and policy governs planning in the ACT. The *Australian Capital Territory (Planning and Land Management) Act 1988* (Cwlth) established the National Capital Authority. This Act also enables the Legislative Assembly to establish a statutory planning authority, currently the ACT Planning and Land Authority, to develop and implement the Territory Plan. The *Planning and Development Act 2007* (ACT) requires the Territory Plan to set out the planning principles and polices for giving effect to its object in a way that gives effect to sustainability principles, including policies that contribute to achieving a healthy environment in the ACT.[103]

The Natural Temperate Grassland component of the lowland native grassland is one of Australia's most threatened ecosystems (*see* Section 1.2). Therefore, conservation of the remaining areas of lowland native grassland is critical for national biodiversity conservation. The ACT retains significant remnants of the original extent of Natural Temperate Grassland, however, the small size and fragmented nature of many of the remaining grassland areas pose particular difficulties for conservation planning.

Central Canberra / Tuggeranong and Belconnen geographic areas have large areas of grassland that were used for rural land uses and then extensively cleared for residential development, primarily more than 30 years ago. As a result, there are a relatively high number of sites within these geographic areas but they are, on average, much smaller than other areas. These sites generally occur on land that has been defined as open space, such as

[103] *Planning and Development Act 2007*, section 49.

Constitution Avenue, Reid (CC02), on land that was to be used for other purposes, such as the Australian Centre for Christianity and Culture, Barton (CC04), which was to be used for erection of a cathedral, or as an edge to a development, such as CSIRO Headquarters (CC01). Despite their high level of isolation and small size, there remains some very floristically diverse grassland, particularly the Australian Centre for Christianity and Culture, Barton (CC04).

Table 6: Areas of lowland native grassland in the ACT, based on geographic location

Region	Total LNG area	Total area of LNG	Total NTG	Total area of NTG	Sites	Av. size of sites	Category 1 sites
	ha	%	ha	%	no.	ha	no. (%)
Majura Valley	641.3	29	208.9	20.3	6	107	5 (83)
Jerrabomberra Valley	697.1	31.5	267.4	26.0	10	70	5 (50)
Gungahlin	410.1	18.5	179.2	17.4	8	51	3 (38)
Belconnen	426.0	19.3	338.6	32.8	12	36	5 (42)
Central Canberra/ Tuggeranong	36.5	1.7	35.8	3.5	12	3	2 (17)
Total	2211.0	100	1,029.9	100	48	–	–

Notes:

LNG = lowland native grassland; NTG = Natural Temperate Grassland.

Category 1: Core Conservation Site – sites in this category meet the following criteria: high botanical significance rating, or key threatened species habitat, or large site (more than 100 hectares) with a Botanical Significance Rating of 3.

Category 2: Complementary Conservation Site – sites in this category meet the following criteria: moderate botanical significance rating, or threatened species habitat, or medium site (10 to 100 hectares) with a Botanical Significance Rating of 4.

Category 3: Landscape and Urban Site – sites in this category meet the following criteria: low to very low botanical significance rating small to very small area (less than 10 hectares), and may contain small populations of threatened species in marginal or fragmented habitat that is considered to be not viable in the medium to long term (*see* Action Plan No. 28, pages 56–59).

Source: Action Plan No. 28, pages 48-49.

On the other hand, large areas remain in the Majura Valley and Jerrabomberra Valley that often contain significant habitat for threatened species, are connected by corridors to other native grassland or woodland, and retain sufficient buffers to provide protection from edge effects. Importantly, there is proportionally more Category 1: Core Conservation Sites in the undeveloped, larger sites in the Majura and Jerrabomberra valleys than in any other area in the Territory.

Recognition of the importance of grasslands has increased and is reflected through legislation (declarations of Natural Temperate Grassland and associated threatened species), communication, and education; the rate of loss of sites has reduced in the past 15 or so years.[104] However, some proposed developments have the potential to involve removal of areas of lowland native grassland or will compromise the integrity of sites by increasing fragmentation of sites and populations of threatened species.

Lowland native grassland sites, being located in, or close to, Canberra's urban areas and relatively easy to develop, are frequently considered for their development potential. Often when making development decisions these sites are considered in isolation. A strategic

[104] Pers. comm., Sarah Sharp, Parks Conservation and Lands.

approach across the ACT is needed to give the highest level of protection to those lowland native grassland sites with the highest ecological values, provide connectivity between these sites, and foster appropriate development. This approach needs to involve identification of the long-term land uses for all lowland native grassland sites, and use of offsets to allow development of others. Given that there may be difficulties in always having a 'like for like' replacement, offsets that involve the use of offset restoration sites, funding research or restoration programs should be considered.

The ACT and Australian governments have enacted legislation that facilitates protection of lowland native grassland areas and species, particularly those listed as threatened; and both these Governments own lands that have significant lowland native grassland areas. Therefore, both governments need to agree on a strategic approach to protect these grassland sites for this to be effectively implemented.

Recommendation 22: The ACT Government and the Australian Government commit to taking a strategic approach to protecting lowland native grassland, in particular Natural Temperate Grassland, threatened grassland species and fostering sustainable development by:

- Giving priority to protecting all Category 1: Core Conservation Sites that contain Natural Temperate Grassland and key threatened grassland species, and ensuring that these areas are not affected by development proposals.
- Placing in a reserve, where appropriate, Natural Temperate Grassland sites in Category 1: Core Conservation Sites. If this is not possible, these grassland areas and associated species should be conserved and managed as if in a reserve.
- Integrating conservation values with development considerations for all Category 2: Complementary Conservation Sites and Category 3: Landscape and Urban Sites and ensuring connectivity is retained or enhanced.
- Developing an offset policy (that includes identification of offset restoration sites) for loss of lowland native grassland, particularly Natural Temperate Grassland, due to development.

5.1 Northern access road – Majura Valley (East)

The Majura Valley is one of the most significant areas in the ACT for threatened species conservation.[105] It contains some of the most diverse and valuable areas of Natural Temperate Grassland and is one of only a few areas containing large contiguous areas of Natural Temperate Grassland (*see* Table 6). Of the approximate 2,200 hectares of lowland native grassland in the ACT, Majura Valley (East), at approximately 500 hectares constitutes around 23% of that total. The Majura Valley (East) contains arguably one of the largest areas of Natural Temperate Grassland remaining in southeastern Australia .[106] It also provides habitat for five threatened species (Button Wrinklewort, Striped Legless Lizard, Grassland Earless Dragon, Perunga Grasshopper and the Golden Sun Moth) (*see* Table 7). The Jerrabomberra and Majura valleys provide the only known habitat for the Grassland Earless Dragon in the ACT, and these sites form the largest remaining contiguous area of habitat for

[105] David Hogg Pty Ltd, Eastern Broadacre Planning Study, Assessment of Ecological Opportunities and Constraints, June 2008, page 19.

[106] Pers. comm., Sarah Sharp, Parks Conservation and Lands.

the species. Three sites in the Majura Valley, Air Services Beacon (MA02), Canberra International Airport (MA03) and Malcolm Vale (MA04), are being considered for listing as Natural Areas on the *Commonwealth Heritage List*.

Currently, the Majura Valley is an outstanding example of co-existence of lowland native grassland with a range of land uses including Majura Training Area (MA01) (including a firing range), Air Services Beacon (MA02) and Canberra International Airport (MA03). Canberra International Airport (MA03) is a key location on Canberra's eastern ring road, only eight minutes from Canberra's Central Business District and identified as an Activity Node in the Canberra Spatial Plan.[107] Airport expansion will likely affected lowland native grassland sites. This site comprises Natural Temperate Grassland, which is the highest priority for conservation, and areas of native pasture and exotics, which are of comparative lower conservation value (*see* Table 7).

Development within the airport precinct, including development of runway infrastructure in 2001 and construction more recently of the Brand Depot has reduced the area of Natural Temperate Grassland and habitat for the Grassland Earless Dragon and Golden Sun Moth; it also required salvage of five specimens of Grassland Earless Dragon.

There is a proposal for a potential northern access road to link the Fairbairn precinct of the airport to Majura Road, immediately north of the airport. Currently land to the north of the airport is National Land owned by the Department of Defence (Majura Training Area (MA01)).

Under this proposal, the Australian Government would excise 38 hectares of land adjoining the northern boundary of the airport from the Majura Training Area (MA01) to the Department of Transport and Regional Services for incorporation into the lease area of Canberra International Airport (MA03). The Canberra Airport Group intends constructing a dual carriageway (four lanes) including a median strip and cycle path. The planned route for this road is through a Category 1: Core Conservation Site, containing the largest remaining patch of endangered Natural Temperate Grassland in the ACT that provides habitat for a number of threatened species, including the Grassland Earless Dragon (*see* Table 7).

The current proposed road location would likely jeopardise the long-term viability of this Core Conservation Site as it would remove some of the grassland for construction of the road and associated infrastructure of drainage and piping, and will fragment the remaining areas of grassland. The ability of the Grassland Earless Dragon to cross obstacles, such as roads or drainage ditches, is uncertain[108] and a major road through this area would probably create a significant barrier to the movement of this species, fragmenting its population and isolating the population within the airport. This may prevent or constrain repopulation, should the population decline under unfavourable conditions (such as the recent population decline in the Majura Training Area (MA01)). The future planned development will also likely remove habitat, if allowed to proceed.[109]

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[107] Canberra Spatial Plan, ACT Planning and Land Authority, 2004.

[108] David Hogg Pty Ltd, Eastern Broadacre Planning Study, Assessment of Ecological Opportunities and Constraints, June 2008.

[109] Action Plan No. 28, page 62.

This development proposal, in its current location, creates a conflict between airport expansion and protection of Category 1: Core Conservation Sites [110] areas of Natural Temperate Grasslands. However, it appears to be possible to provide access by a number of alternative routes and protect the Natural Temperate Grassland and known contiguous habitat of the Grassland Earless Dragon.

As this land contains Natural Temperate Grassland, which is listed as an endangered ecological community under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), a referral of this proposed action was made by the Department of Defence to the former Australian Government Department of the Environment and Water Resources in September 2007. This was assessed on 9 November 2007.

As mentioned in Section 1.3, this Office held a meeting with the Australian Government agencies involved in the proposed excision of a section of the Department of Defence land at the Majura Training Area (MA01) and its potential transfer to the Canberra Airport Group to accommodate construction of a road on 14 October 2008. As the approval for the excision resides with the Prime Minister, the Commissioner wrote to him on 16 October 2008 seeking reassessment of the proposal; taking into account the need for the road against the potential extinction of a species, the availability of more recent data and the increased pressures on the land since the department undertook its assessment in December 2007. The Minister for Finance and Deregulation, the Hon Lindsay Tanner MP, responded in late November 2008 on behalf of the Prime Minister indicating that a formal decision on whether to proceed with the proposed disposal of the site had not been made. The Minister for Environment, Heritage and the Arts, the Hon Peter Garrett AM MP, responded on 20 January 2009 indicating that the department is currently reviewing the result of recent monitoring of the apparent decline in the population of Grassland Earless Dragon and the Natural Temperate Grassland in the Majura Valley and will consider that information if a referral is made under the *Environment Protection and Biodiversity Conservation Act 1999* to build a road through the site.

Given the significance of the Majura Valley grassland, the presence of the Grassland Earless Dragon and other threatened species, it is strongly recommended that a commitment be made to create a reserve in the Majura Valley. This reserve should be defined in the near future and include part of the Majura Training Area (MA01), and potentially parts of Air Services Beacon (MA02) and 'Malcolm Vale' (MA04). Connectivity with the Canberra International Airport (MA03) will be particularly important in protecting the Grassland Earless Dragon. As current land uses on these sites, if managed effectively, are compatible with sustaining the ecological values of the grassland, areas nominated for inclusion in the proposed reserve could continue being used for their current purpose and managed by the existing land managers.

While defining the site of the proposed Majura Valley reserve would constrain future development options, for example, the potential Canberra International Airport northern link road and the potential east-west Kowen road, it would provide a more certain context for potential developments. It would also ensure that the Natural Temperate Grassland, the Grassland Earless Dragon and other threatened species are not adversely affected through incremental developments, as would be the case if the potential Canberra International Airport northern link road and the potential east-west Kowen road were to be progressed according to existing concept plans.

[110] Action Plan No. 28, page 57.

Table 7: Grassland type and conservation significance for the Majura Valley (East).

Site name	Site no.	Site size (ha)	Dominant grassland type	Key habitat	Species present	Comments	Conservation category
Majura Training Area	MA01	126.6	Natural Temperate Grassland	Grassland Earless Dragon Striped Legless Lizard Golden Sun Moth Button Wrinklewort	Perunga Grasshopper	Links with extensive woodland	1
Air Services Beacon	MA02	10.7	Natural Temperate Grassland	Grassland Earless Dragon Striped Legless Lizard Golden Sun Moth	Perunga Grasshopper	Surrounded on three sides by MA01	1
Canberra International Airport	MA03	203.6	Natural Temperate Grassland	Grassland Earless Dragon Golden Sun Moth	Perunga Grasshopper	Contiguous with MA01	1
Malcolm Vale	MA04	155.4	Native Pasture		Grassland Earless Dragon Golden Sun Moth	Contiguous with MA01	2
Total contiguous area (ha)		496.3					

Notes:

Category 1: Core Conservation Sites – sites in this category meet the following criteria: high botanical significance rating, or key threatened species habitat, or large sites (more than 100 hectares) with a botanical significance rating of 3.

Category 2: Complementary Conservation Sites – sites in this category meet the following criteria: moderate botanical significance rating, or threatened species habitat, or medium area sites (10 to 100 hectares) with a botanical significance rating of 4.

Category 3: Landscape and Urban Sites – sites in this category meet the following criteria: low to very low botanical significance rating; and small to very small area (less than 10 hectares); and may contain small populations of threatened species in marginal or fragmented habitat that is considered to be not viable in the medium to long term (*see* Action Plan No. 28, pages 56–59).

The lands for the proposed reserve could be the subject of a formal (conservation) agreement between the ACT and Australian governments.

Recommendation 23: Plan a Majura Valley Reserve to protect Natural Temperate Grassland and its supporting species, particularly the Grassland Earless Dragon, by defining the boundaries of this proposed reserve in the near future.

5.2 Eastern Broadacre Planning Study

The eastern broadacre area (Majura–Symonston–Jerrabomberra area) is located on the eastern edge of the ACT. It is close to the New South Wales border and contains key infrastructure including Majura Road, the Monaro Highway and the Canberra International Airport.

The Eastern Broadacre Planning Study is a preliminary investigation of the economic potential of the eastern broadacre area as a future employment corridor, as identified in the Canberra Spatial Plan.[111] The area includes industrial areas at Symonston, Hume and Fyshwick. A number of lowland native grassland sites are located in the eastern broadacre area.

The Jerrabomberra Valley contains large and diverse areas of Natural Temperate Grassland, a range of threatened flora and fauna and connectivity between the grassland–woodland ecological communities. The valley is divided east–west by the Monaro Highway. Key issues for protection of the lowland native grassland are maintenance of large heterogeneous areas and provision of connectivity between the high value areas east and west of the highway, across the ACT–NSW border and between the grassland and woodlands.

The eastern broadacre area provides habitat for threatened grassland species. Of particular concern for the eastern broadacre area are the populations of the Grassland Earless Dragon and the Striped Legless Lizard. The habitat in the Majura and Jerrabomberra valleys is of high priority nationally for survival of the Grassland Earless Dragon; existing populations have been confirmed within the study area.[112]

The Eastern Broadacre Planning Study will help identify areas that may be suitable for future development for employment uses, and those that should be set aside for environmental, transport or other needs. It may require changes to the Territory Plan to provide a greater range of employment uses (such as industry, commercial, warehousing, tourism). Areas already in reserve are not identified as suitable for future development.

In addition to the values of the Majura Valley (East) grasslands that have been discussed in Section 5.1, the values in the remainder of the study area Majura Valley (West) and the Jerrabomberra Valley are discussed below.

[111] Canberra Spatial Plan, ACT Planning and Land Authority, 2004.

[112] David Hogg Pty Ltd, Eastern Broadacre Planning Study, Assessment of Ecological Opportunities and Constraints, June 2008.

A potential key constraint for development in this area is that of the endangered Grassland Earless Dragon which appears to survive only in the study area and adjacent low-lying areas in New South Wales.[113]

Campbell Park (MA05) in the Majura Valley is a small parcel of Commonwealth land in good condition that contains Natural Temperate Grassland, has a population of the Grassland Earless Dragon and is classified as a Core Conservation Site. It adjoins Majura West (MA06), Territory Land, which is a large area that contains the endangered Grassland Earless Dragon. Majura West (MA06) is an important ecotone (where the two ecosystems of lowland native grassland and Yellow–Box Red Gum Grassy Woodland merge), is the only Category 1: Core Conservation Site that does not contain Natural Temperate Grassland, and lends itself to being an offset restoration site for actions to be implemented to improve the habitat of the Grassland Earless Dragon.

Majura West (MA06) is contiguous with Campbell Park (MA05) and Mount Ainslie Reserve. From information considered in this investigation, it appears that potential developments in the Majura Valley have been planned to avoid these areas. Given this and their ecological value it seems appropriate for all or parts of these sites to be included in Mount Ainslie Reserve.

Recommendation 24: Expand the Mount Ainslie Reserve to include areas of lowland native grassland in Campbell Park (MA05) and Majura West (MA06).

5.2.1 Potential east-west Kowen road

The origins of the potential Kowen link in the Majura Valley are in the Canberra Spatial Plan,[114] which identifies Kowen for long-term urban development. This concept is being investigated, at a preliminary level as part of the Eastern Broadacre Planning Study work, whereby high-level traffic and transport modeling to the years 2031 and 2051 has been undertaken. Any future urban development at Kowen is likely to require at least two high-capacity road links. This could include:

- A Kowen link road potentially extending from Northcott Drive, across Majura Parkway and then across Defence land north of the airport site to Kowen. This road would be two lanes each way, and would need to connect with the Canberra International Airport northern link road if approved.
- A second link (the northern link road) potentially as an extension of Wakefield Avenue across Defence land to Kowen.

These roads could have environmental impacts, particularly on lowland native grassland areas; of which Natural Temperate Grasslands is of particular concern.

Given the potential significant impact such a development could have on the grasslands in the Majura Valley, the Commissioner wrote to the Director Roads ACT on 16 October 2008 asking that road access to the proposed Kowen development be located outside areas of Natural Temperate Grassland, so as to not adversely impact the Natural Temperate Grassland areas in the Majura Valley.

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[113] David Hogg Pty Ltd Eastern Broadacre Planning Study, Assessment of Ecological Opportunities and Constraints, June 2008.

[114] Canberra Spatial Plan, ACT Planning and Land Authority, 2004.

At a meeting on the Majura Parkway Environmental Impact Assessment on 19 December 2008, the Commissioner and her staff were informed that the east-west Kowen road had been removed from the options.[115] While this is the case, security for the Natural Temperate Grassland in the Majura Valley could be more assured if Recommendation 23 were adopted and a Majura Valley reserve was planned that has connectivity with the Canberra International Airport (MA03) to particularly protect the Grassland Earless Dragon.

5.2.2 Mugga Mugga Homestead

The Mugga Mugga Homestead (JE01) is a Category 2: Complementary Conservation Site and is not affected by the proposed future employment corridor.

5.2.3 'Callum Brae'

'Callum Brae' (part JE02) is a Category 1: Core Conservation Site and provides habitat for the Grassland Earless Dragon, Golden Sun Moth and Perunga Grasshopper. As previously mentioned, 9.4 hectares of this site has been identified for development as a long-stay caravan park. The 'Callum Brae' grassland (under lease) forms a very important link for maintaining habitat connectivity with Jerrabomberra West Reserve (JE03) and the 'Callum Brae' Woodland Reserve. The areas of ecological connectivity need to be defined. Areas of ecological connectivity could be managed under a conservation lease or, depending on location, amalgamated with the adjoining rural lease. If development occurs, an offset should be required.

5.2.4 Jerrabomberra West Reserve

Jerrabomberra West Reserve (JE03) is a Category 1: Core Conservation Site and is contiguous with 'Callum Brae' (JE02) to the north and woodland to the east. This site contains Golden Sun Moth, Grassland Earless Dragon and Pink-tailed Worm Lizard (*Aprasia parapulchella*). The reserve was gazetted in March 2008.

5.2.5 Woods Lane

Woods Lane (JE04) is a Category 2: Complementary Conservation Site. It is part of a habitat corridor between the Letchworth lowland native grasslands and Queanbeyan Nature Reserve to the east in New South Wales, separated by the railway line and the proposed Jerrabomberra East Reserve (JE05) to the west. This site provides connectivity between the proposed Jerrabomberra East Reserve (JE05) and grassland within New South Wales. Efforts should be made to retain this connectivity.

5.2.6 Proposed Jerrabomberra East Reserve

The proposed Jerrabomberra East Reserve (JE05) is a Category 1: Core Conservation Site. It is contiguous with other lowland native grassland in Harman Bonshaw, the Alexander Maconochie prison site and Woods Lane (JE04), which forms a corridor with grasslands in New South Wales. The site contains populations of Grassland Earless Dragon and Golden Sun Moth. In May 2004 in the ACT Government announced creation of the East Jerrabomberra Nature Reserve. The ACT Planning and Land Authority has invited the Conservator of Flora and Fauna to identify the boundaries of the East Jerrabomberra area recommended as public land for the purpose of a nature reserve, pursuant to section 314 of

[115] This does not mean that this option will not be re-investigated at some future time.

the *Planning and Development Act 2007* (ACT). The ACT Planning and Land Authority will progress a draft variation to the Territory Plan upon receipt of the relevant information from the Conservator.

5.2.7 Harman Bonshaw South

Harman Bonshaw South (JE06)[116] is a Category 1: Core Conservation Site and is contiguous with Harman Bonshaw North and the proposed East Jerrabomberra Nature Reserve. The site contains populations of Grassland Earless Dragon and Golden Sun Moth. This site needs to be appropriately managed to retain habitat for threatened species.

5.2.8 Harman Bonshaw North

Harman Bonshaw North (JE07)[117] is a Category 1: Core Conservation Site providing habitat for the Grassland Earless Dragon and connectivity through the grassland sites in the Jerrabomberra Valley. It provides a native vegetation corridor with Harman Bonshaw South and with grassland within New South Wales.

5.2.9 'Cookanalla'

'Cookanalla' (JE08) is a Category 2: Complementary Conservation Site. It has previously been identified as habitat for the Grassland Earless Dragon; however, it appears that due to fragmentation and overgrazing during the prolonged drought the habitat may have deteriorated.

Based on field assessment, information and advice collected during the course of this investigation, it appears that this site is able to accommodate a long-term land use that integrates conservation and development. However, before this can occur a Grassland Earless Dragon survey is needed in conjunction with a survey to identify habitat that would support this species. Given the condition of the site, it may be appropriate to undertake surveys when the site has recovered, at least to some degree, from its current threatening processes. This site appears to lend itself to a land use that integrates conservation values with development. If areas of grassland are developed an offset should be required.

5.2.10 Advanced Manufacturing Technology Estate

The Advanced Manufacturing Technology Estate (AMTECH (JE09)) is a Category 2: Complementary Conservation Site. The AMTECH site contains 18 hectares of Natural Temperate Grassland. In 1993 the ACT Government developed Stage 1 of the estate after an approach from Canberra Region Advanced Technology Manufacturing Association seeking suitable sites for their members to co-locate. The estate is approximately 30 hectares with 18 blocks available in Stage 1 and about 34 blocks identified for Stage 2; the grassland site is located in part of Stage 2.

The Grassland Earless Dragon population has in the past been located within Stage 2 of the estate. However, a survey in the summer of 2007–08 found no evidence of the dragon remaining on the site.[118] The loss of the Grassland Earless Dragon population may be a result

[116] The ACT Government has indicated it would make this site a nature reserve when it is sold.

[117] The ACT Government has indicated it would make this site a nature reserve when it is sold.

[118] David Hogg Pty Ltd, Eastern Broadacre Planning Study, Assessment of Ecological Opportunities and Constraints, June 2008.

of ongoing drought conditions in recent years.[119] The prospect of the area being re-populated naturally under better conditions is not favourable due to the likely barrier effect of Hindmarsh Drive, which separates the site from 'Cookanalla' (JE08) and is likely to be a significant barrier to the dragons' movement.

Reassess the site's ecological values as these may have changed. If this site no longer meets criteria for its current classification as a Category 2: Complementary Conservation Site and changes to Category 3: Landscape and Urban Sites, its development potential could be realised. If areas of grassland are developed an offset should be required.

5.2.11 Tennant Street, Fyshwick

The 0.3 hectares of Natural Temperate Grassland within a matrix of disturbed lowland native grassland alongside Tennant Street, Fyshwick (JE10) is a Category 2: Complementary Conservation Site. The site is located on the edge of the Fyshwick industrial zone and has been identified for retention within a recreation corridor linking Tennant Street and the Molonglo River, if the remainder of the site is developed. The site should be managed for conservation values within its future situation within a low-key recreational area.

5.3 Belconnen

5.3.1 Lawson Concept Planning Study – Lawson Territory and Lawson Commonwealth

Lawson Territory (BE07) is a Category 3: Landscape and Urban Site comprising mainly native pasture. There is a population of the Golden Sun Moth adjacent to the Belconnen Naval Transmission Station. Under the Territory Plan it is zoned residential.

The ACT Government has engaged consultants to conduct an environmental, planning and development study for part of the future suburb of Lawson. The study area is 157.38 hectares, of which an estimated 58.5 hectares is developable area and includes Lawson Territory (BE07) which is on Territory Land. The former Belconnen Naval Transmission Station site (BE08a) is not part of the study area.

The planning study is currently scheduled for completion in early 2009. Following finalisation of a concept plan, a variation to the Territory Plan will occur in 2009 to include the concept plan as a precinct code in the Territory Plan. It is anticipated that the land release will occur in two stages in 2009–10 and 2011–12.[120]

As the abutting land, Lawson Commonwealth – Belconnen Naval Transmission Station (BE08(a)), is one of the most important remaining grasslands in the ACT, with three threatened species, including the only known population of the Ginninderra Peppercress, every endeavour should be made to ensure an adequate buffer is situated outside the site (that is, within the Lawson Territory (BE07) land) to provide a habitat buffer and an asset protection zone to the residential area.

A long-term grassland management plan needs to be developed (*see* Recommendation 9 in Table 2). The ACT Government has stated that it wishes to retain this site as a nature reserve, once the Australian Government has relinquished it.

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[119] David Hogg Pty Ltd, Eastern Broadacre Planning Study, Assessment of Ecological Opportunities and Constraints, June 2008.

[120] Pers comm., Ms Trina Mcfarlane, ACT Planning and Land Authority, 5 November 2008.

5.3.2 Kaleen East Paddocks

Kaleen East Paddocks (BE09) is a Category 3: Landscape and Urban Site and comprises 28.2 hectares of lowland native grassland, including 4 hectares of Natural Temperate Grassland. Reassess the site's ecological values, as they were not obvious at the time of inspection. If these values still exist and development were to occur, given the likelihood that there is only a small area of Natural Temperate Grassland remaining, this may be able to be integrated with any future developments.

5.3.3 Caswell Drive

The Caswell Drive (BE10) site is a Category 1: Core Conservation Site of 4.8 hectares of Natural Temperate Grassland. One hectare of this site was lost to the Gungahlin Drive Extension roadworks. This small site is contiguous with the Aranda Bushland Reserve. This site is currently managed under a rural lease. Given is ecological value, amalgamation with nearby reserves would offer long-term protection.

5.3.4 Glenloch Interchange

The Glenloch Interchange (BE11) site is a Category 1: Core Conservation Site of 2.2 hectares of Natural Temperate Grassland that contains a small remnant Snow Gum–Candlebark Tableland Woodland, otherwise isolated by roads. This site is currently managed as a roadside. Given its ecological value, amalgamation with nearby reserves would offer long-term protection.

Recommendation 25: Expand Aranda Bushland and Black Mountain Reserve by including areas of lowland native grassland in Caswell Drive (BE10) and Glenloch Interchange (BE11).

5.3.5 Molonglo and North Weston – Kama South

The future development of Molonglo and North Weston potentially affects the lowland native grassland site of Kama South (BE12), which lies between West and East Molonglo. This is a Category 1: Core Conservation Site comprising 38.5 hectares of Natural Temperate Grassland contiguous with areas of Yellow Box–Red Gum Grassy Woodland. The site is currently zoned as rural and is managed by a licence (agistment).

Territory Plan Variation 281 – Molonglo and North Weston has been approved and commenced on 12 December 2008. This variation enables parts of the Molonglo Valley and North Weston to become urban development areas. The variation does not include the Central Molonglo area, formerly proposed in the preliminary studies for development.[121]

The Variation designates Kama South (BE12) as public land (nature reserve) It also proposes that a buffer to the reserve be located in the development area, not in the nature reserve.

Preliminary environmental investigations in Molonglo and North Weston identified several matters of national environmental significance. These include:

- the Pink-tailed Worm Lizard, listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as vulnerable,
- the White Box–Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native

[121] Pers. comm., Bruce Frazer, ACT Planning and Land Authority, 6 November 2008.

Grassland listed as critically endangered

- the Natural Temperate Grasslands of the Southern Tablelands of New South Wales and the ACT listed as endangered.

Given the presence of these vulnerable and endangered species, the impacts of development in Molonglo and North Weston must be assessed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).

The Australian Government Minister for the Environment, Water, Heritage and the Arts and the ACT Minister for Planning have agreed to undertake a strategic assessment of the proposed Molonglo and North Weston Structure Plan under section 146 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth). The Structure Plan sets out the planning and development guidelines and principles for urban development and associated infrastructure at Molonglo and North Weston. Development actions that do not adhere to the Structure Plan will be required to go through the standard referral and assessment process.

The ACT is an area that is still being planned and developed and it is particularly important that the few remaining areas of Category 1: Core Conservation Sites be given priority for protection and that conservation values are integrated with development considerations in Category 2: Complementary Conservation Sites and Category 3: Landscape and Urban Sites.[122] It is also important for corridors and connectivity to exist between the various sites, regardless of classification (*see* Section 6).

5.4 Central Canberra

5.4.1 Constitution Avenue, Reid

Constitution Avenue, Reid (CCO2) is a Category 2: Complementary Conservation Site of 0.7 hectares of Natural Temperate Grassland. The grassland site is vacant unleased Territory Land and contains the endangered Golden Sun Moth; the entire site is a Designated Area. If a decision is made to develop the Natural Temperate Grassland area, an offset should be required.

There is a need to clarify the long-term land use for some lowland native grassland sites. This investigation found that the condition of some sites suggests that their ecological value may have declined to such a degree that they may need to be reassessed. These sites need to be subjected to an ecological assessed in the appropriate season/s.

In determining the long-term land use of lowland native grassland sites it is important to consider how best to strategically protect lowland native grassland, particularly Natural Temperate Grassland and threatened species, and also develop Canberra. Retaining some small areas of grassland may be appropriate in some circumstances, but not in others. Where retention on a site is inappropriate an offset, for example, undertaking restoration activities on another grassland site or funding research, should be required. It is likely that in many circumstances there will be benefit in having offsets undertaken in a strategic manner by nominating specific offset restoration sites. Recommendations 5 and 22 promote the development of an offset policy (that includes identification of offset restoration sites). Possible offset sites include:

[122] Action Plan No. 28.

- Majura West (MA06) to enhance its habitat to better support the Grassland Earless Dragon
- Yarramundi Reach (CC06), Caswell Drive (BE10) and Glenloch Interchange (BE11) to enhance the overall grassland quality.

Depending on the land use for 'Cookanulla' (JE08), this site may also be appropriate as an offset site.

Recommendation 26: Define the long-term land use for lowland native grassland sites, while strategically protecting lowland native grassland, particularly Natural Temperate Grassland, and progressing appropriate developments, specifically:

- 'Callum Brae' (part JE02) – excluding the land swap site. The areas of ecological connectivity need to be defined. Areas of ecological connectivity could be managed under a conservation lease or, depending on location, amalgamated with the adjoining rural lease. If development occurs, an offset should be required.
- 'Cookanalla' (JE08) – a Grassland Earless Dragon survey is needed in conjunction with a survey to identify habitat that would support this species. Given the condition of the site, it may be appropriate to undertake surveys when the site has recovered, at least to some degree, from its current threatening processes. This site appears to lend itself to a land use that integrates conservation values with development. If areas of grassland are developed an offset should be required.
- AMTECH (JE09) – reassess the site's ecological values as these may have changed. If this site no longer meets criteria for its current classification as a Category 2: Complementary Conservation Site and changes to Category 3: Landscape and Urban Sites, its development potential could be realised. If areas of grassland are developed an offset should be required.
- Kaleen East Paddocks (BE09) – reassess the site's ecological values, as they were not obvious at the time of inspection. If these values still exist and development were to occur, given the likelihood that there is only a small area of Natural Temperate Grassland remaining, this may be able to be integrated with any future developments.
- Lawson Commonwealth – East (BE08(b)) – Given the overall context of this site it appears to lend itself to a land use that integrates conservation values with development. An offset should be required if areas of grassland are developed.
- Constitution Avenue, Reid (CC02) – If a decision is made to develop the Natural Temperate Grassland area, an offset should be required.

Findings that informed Recommendation 27

During the investigation, the Commissioner's Office found it difficult to identify the location of lowland native grassland sites relative to planning zones that guide land use. To help the community and developers gain information on grassland sites relative to planning zones it is recommended that a map of the location of lowland native grassland sites relative to planning zones be published.

Recommendation 27: Publish a map that shows the location of lowland native grassland sites relative to planning zones. This should be readily available through the ACT Planning and Land Authority and the Department of Territory and Municipal Services.

6 Corridors and connectivity

It is important to consider corridors and connectivity, especially for wildlife movement, at a broad landscape level and within or between sites. Local connectivity within sites or between adjacent sites is important for flora generally, and less mobile fauna species, such as the Grassland Earless Dragon, Striped Legless Lizard and Golden Sun Moth, specifically for:

- maintaining genetic diversity within populations
- repopulating an area that may have been subject to population loss through a natural or human-imposed activity, such as a burn.[123]

Despite fragmentation and degradation of Natural Temperate Grassland and Yellow-Box Red Gum Grassy Woodland communities, the Majura and Jerrabomberra valleys retain large areas of native grassy ecosystems in varying degrees of condition, including links between grassland and woodland, which provide significant habitat for native species and possibilities for animal movement.[124]

In terms of biodiversity conservation, the ideal approach is to establish a series of conservation reserves (which may include voluntary schemes) that are of sufficient size and biodiversity to maintain a full range of ecological communities (and hence species) on a long-term basis. It is also desirable for such reserves to be located to enable connectivity for animal movement and other interactions between them.[125]

The natural connections between grasslands and adjoining woodlands have mostly been severed, but should be retained where they still exist.

Important grassland sites for connectivity between woodland and grassland are at:

- Mount Ainslie Nature Reserve and Campbell Park (MA05)
- 'Callum Brae' (JE02)
- Jerrabomberra West Reserve (JE03) and woodland to the west
- Gungaderra Nature Reserve (GU02) and Gungahlin Hill
- Aranda Bushland and Caswell Drive (BE10)
- Majura Valley at the Majura Training Area (MA01).

Important grassland sites for connectivity between grasslands are at:

- Campbell Park (MA05) and Majura West (MA06)
- adjacent grassland on either side of the ACT and New South Wales border via Harman Bonshaw North (JE06) and Harman Bonshaw South (JE07), Jerrabomberra East Reserve (JE05), Woods Lane (JE06), and Queanbeyan Nature Reserve (Letchworth, New South

[123] David Hogg Pty Ltd, Eastern Broadacre Planning Study, Assessment of Ecological Opportunities and Constraints, June 2008.

[124] Report from Parks Conservation and Lands to the ACT Commissioner for Sustainability and the Environment for the Inquiry into the Management of Lowland Native Grasslands, Parks Conservation and Lands, August 2008.

[125] David Hogg Pty Ltd Eastern Broadacre Planning Study, Assessment of Ecological Opportunities and Constraints, June 2008.

Wales)

- adjacent grassland between the Canberra International Airport (MA03) the Majura Training Area (MA01) and 'Malcolm Vale' (MA04).

Development that potentially affects lowland native grassland is either underway or planned for the ACT (*see* Section 5). This development has the potential to sever corridor and connectivity between grasslands and woodlands and / or other adjacent habitats. Many of the recommendations presented in this report reinforce the importance of connectivity. However, efforts to retain connectivity could be assisted if information on the location of lowland native grassland, in particular Natural Temperate Grassland, were readily available.

7 Adaptive management

One of the key features of the lowland native grassland is the habitat it provides for a range of threatened fauna and flora. To restore habitat for fauna, an essential management objective is to maintain or improve the diversity of its structure and native species composition. The long-term sustainability of lowland native grassland requires an adaptive management[126] regime to maintain, improve and restore their ecological condition and habitat quality.[127]

Adaptive management allows for the testing of management practices on site to determine if they are achieving the desired outcome, and adapting them as required. It requires that clearly defined objectives be developed, based on current knowledge of the vegetation community, associated species and their responses to management. It is critical that management goals and on-ground management be subject to ongoing review based on analysis of monitoring results and reporting on management practices, then review of information and making changes as necessary.[128]

This requires that lowland native grassland sites be subject to regular inspections and monitoring programs to ensure threats, such as weeds and overgrazing, are identified quickly enough to prevent damage to sites and before the threatening process reaches a critical stage. Therefore, an annual monitoring program, involving site inspections and photographic recordings, should be developed and maintained to support an adaptive management approach.

Given the multiple jurisdictions and managers of the grassland sites and the desirability of monitoring each site for informing management decisions, the most effective mechanism for this to occur would be to convene a meeting of grassland and landscape ecologists to develop a best-practice monitoring program to be applied at selected sites to monitor impacts and implement adaptive management.

Only 40% of the Territory's lowland native grassland sites are in good condition. This percentage may have been higher if an adaptive management approach had been used to manage all sites. An adaptive management approach is designed to improve environmental management by learning from results. It uses management actions as the primary tool for learning about the system being managed. An adaptive management approach focuses on achieving field results through, among other things, regular site inspections and monitoring (this could include photographic recordings), using research findings to inform management practices, undertaking controlled and monitored experiments, such as, reintroducing targeted species (plants and animals).

An adaptive management approach relies on regular site inspections and routine monitoring, something that was not being undertaken for many of the Territory's sites.

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[126] Adaptive management is an approach designed to improve environmental management by learning from management outcomes. Adaptive management uses management itself as the primary tool for learning about the system being managed through an interactive learning process where the decision-making framework is aimed at reducing uncertainty. Knowledge gained through this process is then feed back into the management strategy in order to determine future courses of action and improve future management. Source: Carl Walters Adaptive Management of Renewable Resources, 1986.

[127] Action Plan No. 28, page 74.

[128] Action Plan No. 28, page 71.

Without regular site inspections and monitoring, threatening processes can go undetected until damage becomes obvious, at which stage the effort and resources needed to restore a site may be significant.

Recommendation 28: Use adaptive management to guide land management so that sites in good condition (40%) are maintained, and those in a critical condition (20%) or approaching a critical condition (40%) are restored.

7.1 Reassess some lowland native grassland sites in the ACT

From submissions received and discussions held with relevant land managers, there is a need for some sites to be reassessed to determine if they should be reclassified or if additional sites should be added to those identified as endangered Natural Temperate Grassland and as lowland native grassland sites.

The North Belconnen Landcare Group has nominated an area near the Evatt Footbridge as a lowland native grassland site. This site needs to be assessed before it is considered for designation as lowland native grassland.

During the investigation it was found that the ecological values on some sites may have changed and therefore these sites need to be reassessed to determine their appropriate classification. These sites are Wells Station Road (GU07); Nicholls (GU08); Novar Street, Yarralumla (CC10); Belconnen Pony Club (GU06); Lawson Commonwealth – East (BE08(b)); and Mitchell (GU05).

Recommendation 29: Assess the ecological values of Evatt Footbridge; Wells Station Road (GU07); Nicholls (GU08); Novar Street, Yarralumla (CC10); Belconnen Pony Club (GU06),; Lawson Commonwealth – East (BE08(b)); and Mitchell (GU05).

8 Communication between stakeholders

We are fortunate in the ACT to have an active and engaged community with 38% of the (18 years and older) population volunteering.[129] This volunteering extends to work being undertaken to protect and conserve lowland native grassland sites and communities in the ACT. Volunteer groups in the Territory include:

- Friends of Grasslands
- Limestone Plains Group
- Bush on the Boundary Reference Group
- Friends of Aranda Bushland
- Ginninderra Catchment Group
- North Belconnen Landcare Group.

The Friends of Grasslands community group is dedicated to conservation of native temperate grassy ecosystems, particularly the endangered Natural Temperate Grasslands. It has over 200 members and educates, advocates and advises on matters to do with conservation of grassy ecosystems, and carries out surveys and other on-ground works.

The Limestone Plains Group is an alliance of ACT scientists and nature conservation groups advocating responsible and ecologically informed management of grassy ecosystems in the ACT and region.

The Bush on the Boundary Reference Group is currently specifically focused on issues of conservation in the Gungahlin area. Other Parkcare, Landcare and Friends groups tend to be focused on undertaking management and conservation actions at specific sites, and in this, are frequently supported by ACT Government personnel.

Conservation of our lowland native grassland, along with the entire natural environment in the ACT is both a government and community responsibility, including private landholders. Increasing the awareness and involvement of landholders and the wider community in the conversation of the lowland native grassland and biodiversity in general is a major challenge. Building upon the existing networks and arrangements for participation in collaborative and cooperative arrangements seems to be the most effective approach to conservation in the Territory. The building of partnerships between government and community, with resources and support as appropriate, will play an increasingly important role in biodiversity conservation in the ACT.[130]

Voluntary work should be actively encouraged for the ongoing management and conservation of the lowland native grassland sites. For example, community group members and other individuals might be able to assist in research, monitoring and reporting programs, possibly through a community partnership approach.

Many stakeholders, researchers and experts were concerned about not having the opportunity to meet with each other and land managers, as a group, to share information.

[129] State of the Environment Report 2007–08 ACT, Overview and Recommendations Paper, page 6.

[130] ACT Nature Conservation Strategy, 1997.

This could be overcome by conducting an annual community and stakeholder forum to, among other things coordinate research, monitoring and data collection, and raise awareness. The Commissioner's Office would be willing to convene the initial forum.

Recommendation 30: Conduct an annual community and stakeholder lowland native grassland forum to, among other things, coordinate research, monitoring and data collection, and raise awareness.

There is a wealth of information and expertise in the Capital region on lowland native grassland, but it is dispersed and therefore difficult to access. This difficulty could be addressed by establishing an accessible central register of information on lowland native grassland that includes current research and studies. This could be made available through a website.

Recommendation 31: Establish an accessible central register of information and expertise on lowland native grassland.

8.1 Indigenous stakeholders

During this investigation, some members of the Indigenous community meet with the Commissioner and her staff and highlighted the significance of the grassland sites to the Aboriginal culture, in particular the lowland native grassland sites of Crace and Lawson. Mr Shane Mortimer, of the Ngambri people, expressed his views, which are included in this report as Appendix 9.

8.2 Awareness

A gap in the long-term conservation of the lowland native grassland is that of community awareness. The ACT community needs to be made aware of the values of the lowland native grassland and other natural assets in the Territory to ensure their long-term survival.

The Australian Centre for Christianity and Culture, Barton (CC04) lessees are very aware of the value of their grassland and have been actively managing their site. The ecological values of the site are well respected by the lessees, who have taken significant effort to ensure the grassland remains in good condition, and that any activities on the site do not compromise the grassland. Parks Conservation and Lands staff within the Department of Territory and Municipal Services have worked closely over the past 15 years with the lessees to ensure the values are retained, and a good relationship has developed between the lessees and this agency's staff.

Australian Centre for Christianity and Culture staff and managers have welcomed opportunities for community groups and individuals from neighbouring government agencies to visit the site, to learn more about the endangered Natural Temperate Grassland community and associated flora and fauna. Such groups and individuals have provided input on the management and conservation values on the site, including the first record of the endangered Golden Sun Moth found on the site. Friends of Grasslands were represented on a management group that met for some years. Parks Conservation and Lands staff have been invited to speak to about the ecological values of the site at public occasions. The site managers have incorporated local grassland species into the biblical gardens that have been

established on the periphery of the grassland site and the grassland site itself is an integral part of the design and use of the site.

The position of the site in central Canberra, the ease of access, the unique blend of cultural, environmental and religious values represented and the beauty of the site overlooking the lake and hills to the north and east make it a prime site for enhancing visitation and increasing community awareness.

While in some spheres, community awareness of the importance of the ecological value of lowland native grassland and the species it supports has increased significantly over the past 15 years, awareness within the general public still appears limited. Awareness could be increased, for example, by:

- placing signage with interpretative material at key sites, such as Canberra International Airport (MA03); St John's Church, Reid (CC03); Australian Centre for Christianity and Culture, Barton (CC04); 'Callum Brae' (JE02); Jerrabomberra West Reserve (JE03); Jerrabomberra East Reserve (JE05); Mulanggari Nature Reserve (GU01); Gungaderra Nature Reserve (GU02); Crace Nature Reserve (GU03); North Mitchell (GU04); and Dunlop Nature Reserve (BE02)
- promoting sites as part of the Territory's Tracks and Trials Heritage Interpretative Tour
- encouraging use of lowland native grassland in restoration and rehabilitation projects following development activities such as new suburbs and road construction
- encouraging use of native grasslands to replace lawns and gardens in private and public places, which could lead to lower ongoing maintenance costs and reduced water use
- adopting a patron for Natural Temperate Grassland and endangered grassland species.

Recommendation 32: Increase community awareness of the importance of lowland native grassland, in particular Natural Temperate Grassland and the endangered grassland species.

Appendixes