An Action Plan for Habitat Management within the Western Sector of the Kanangra-Boyd to Wyangala Corridor of the Great Eastern Ranges (2014-2017)

Hovells Creek Landcare Group Incorporated

2014

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Executive Summary

This Action Plan for habitat management and Landcare in the western sector of the Kanangra-Boyd to Wyangala (K2W) bird migration corridor (Figure 2) was developed by the Hovells Creek Landcare Group Inc (HCLG) with funding sponsorship from the Great Eastern Ranges Initiative (GERI) and considerable input from the local community, local landholders and technical experts in wildlife and habitat management. Support was also provided by Mid Lachlan Landcare, the Lachlan Catchment Management Authority (LCMA) and the NSW Office of Environment and Heritage (OEH).

A community workshop at the Wyangala Country Club on 19 September and subsequent community/technical consultations, identified four key Action Themes and attenuate Action Tasks/Projects as follows:

1. Habitat management, revegetation and vegetation enhancement

The forested ridge tops of the Mt Darling and Botanical/Decca Ranges (approximately 26 000 ha) for which follow up work on access, fire management, weed and feral animal pest control is recommended. Investigation of voluntary conservation agreements and stewardship payment options for long-term protection of wildlife habitat on farmland is also recommended.

The farm zone comprising deeply dissected steep and hilly, upland country (approximately 58 500 ha) with a good remnant tree cover (at least one tree per hectare and numerous clumps of more dense vegetation), and the lower slopes and flood plains (approximately 6 100 ha) used for more intensive grazing and cropping with fewer remaining paddock trees. Recommended action for this zone includes new paddock tree planting, retention of dead paddock trees as nest sites, protecting and rehabilitating larger patches of remnant vegetation, and monitoring use of the farm zone by migratory/other birds/native wildlife.

The riverine zone (approximately 1 200 ha) along the Lachlan and Abercrombie Rivers, and Hovells and Milburn Creeks are recognised as significant drought refuges and migratory pathways for birds but require regeneration of native trees and shrubs, protection from overgrazing, and some erosion control measures.

2. Weed management

Weeds management in the sector emerged as one of the critical habitat management 'hot topics' and the subject of significant discussion during the workshop. The key issues and actions raised include improved advisory materials for landholders, cooperative community managed bio-control programs and improved road plant and on-farm bio-security and weeds hygiene. The workshop also supported a Landcare submission on K2W weed issues to the Natural Resources Commission (NRC) strategic review of weed management in NSW.

3. Feral Animals

Another 'hot topic', feral animals are of concern across the K2W corridor. Recommended action includes regional landholder collaboration on feral pig, fox and cat control, including follow-up on the Boorowa Community Landcare Group coordinated baiting program, and broader

community education on the impact of feral animals on native wildlife, including dumping of domestic cats in rural areas.

4. Cultural heritage

The K2W landscape holds significant cultural heritage values, particularly for people of aboriginal descent whose ancestors would have used the river systems for food, shelter and access prior to European settlement. The loss of traditional land management practices such as traditional burning is believed to be having an impact on habitat condition and fire susceptibility of current landscapes. Following the Wyangala workshop, GERI has brought the key cultural heritage stakeholders together to develop a 'Cultural Connections' program to progress many of the initiatives embodied in this section of the Action Plan across the K2W corridor as a whole.

To give effect to this Action Plan the community participants have identified (self-selected) teams of land managers having common strengths, goals, strategies, and possible actions, including areas where further assistance may be required. Just under 1000 private landholders and three key managers of public lands (State Parks, National Parks and Forestry Commission) have been identified within the project area. The report highlights areas where the skills and resources are available within the community, and motivation to work both within stakeholder groups and across stakeholder groups.

Figure 1. A key stakeholder, the Rainbow Bee-eater, visits the K2W corridor during its annual south-north migration (Photo courtesy Warren Chad, Cowra Woodland Bird Group).

Acknowledgements

Some sixty K2W stakeholders contributed to the development of this action plan. Not all were able to participate in the Wyangala workshop due to other commitments, but never-the-less contributed by way of support or comment on the draft plan. We thank all our Action Plan contributors. Our special thanks go to the Great Eastern Ranges Initiative (GERI) management team hosted by the NSW Office of Environment and Heritage (OEH) for their funding support and enthusiastic input to the project, to the Wyangala Country Club who made their facilities available for the workshop, to the Lachlan Catchment Management Authority who provided technical support and maps, to Lyndal Hasselman who coordinated the workshop and produced and initial draft plan, to Mary Bonet of Upper Lachlan Landcare for photographs used in this report, to Vanessa Cain of Mid Lachlan Landcare for her background research, drafting and project secretariat support and to members of the Hovells Creek Landcare Group who were prepared to take on the unchartered waters of this new project initiative.

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Introduction

The Great Eastern Ranges Initiative (GERI) is a continental-scale conservation project focussed on the eastern ranges of Australia that extends more than 3600 km from western Victoria into far North Queensland. The project aims to enhance vegetation connectivity in order to adapt to future environmental threats, ensuring the long-term survival of many species, particularly migratory. To do this, GERI facilitates the establishment of partnerships at the local level so that local issues can be identified and conservation efforts carried out on a collaborative basis. Further information can be found on the GERI website at www.greateasternranges.org.au.

This project aimed to clarify key species migration patterns, their current habitats and migration staging posts, problem links, and the need for additional habitat on public and private lands in the western sector of the Kanangra Boyd to Wyangala (K2W) corridor. This project also intended to identify key conservation issues and engage organisations and communities that lie within the K2W corridor.

The development of a regional Action Plan, initiated by the Hovells Creek Landcare Group and funded by the Great Eastern Ranges Initiative's 2013 Landcare and Community Grants program, is a key output of the project that will guide future Landcare work to protect and manage remnant habitat and vegetation regeneration works on private and public lands. It is anticipated that this Action Plan will also provide background, structure and clarity to future funding applications.

The Hovells Creek Landcare Group comprises key landholders and their contacts in the Wyangala, Hovells Creek, Reids Flat and Taylors Flat region at the western end of the K2W corridor and its intersection with box-gum grassy woodland of the western plains. The Group has over 20 years experience in the protection of remnant vegetation, stream bank rehabilitation and paddock tree plantings on private farmland (www.hovellscreeklandcare.wordpress.com). Community based Landcare groups are key coordinators and managers of on-ground conservation and land management initiatives within the K2W corridor.

The Hovells Creek Landcare Group project area is located at the western edge of K2W, roughly centred around Wyangala Dam and bounded by Woodstock to the north, Hovells Creek to the west, Taylors Flat in the south and Bigga to the east (Figure 2).

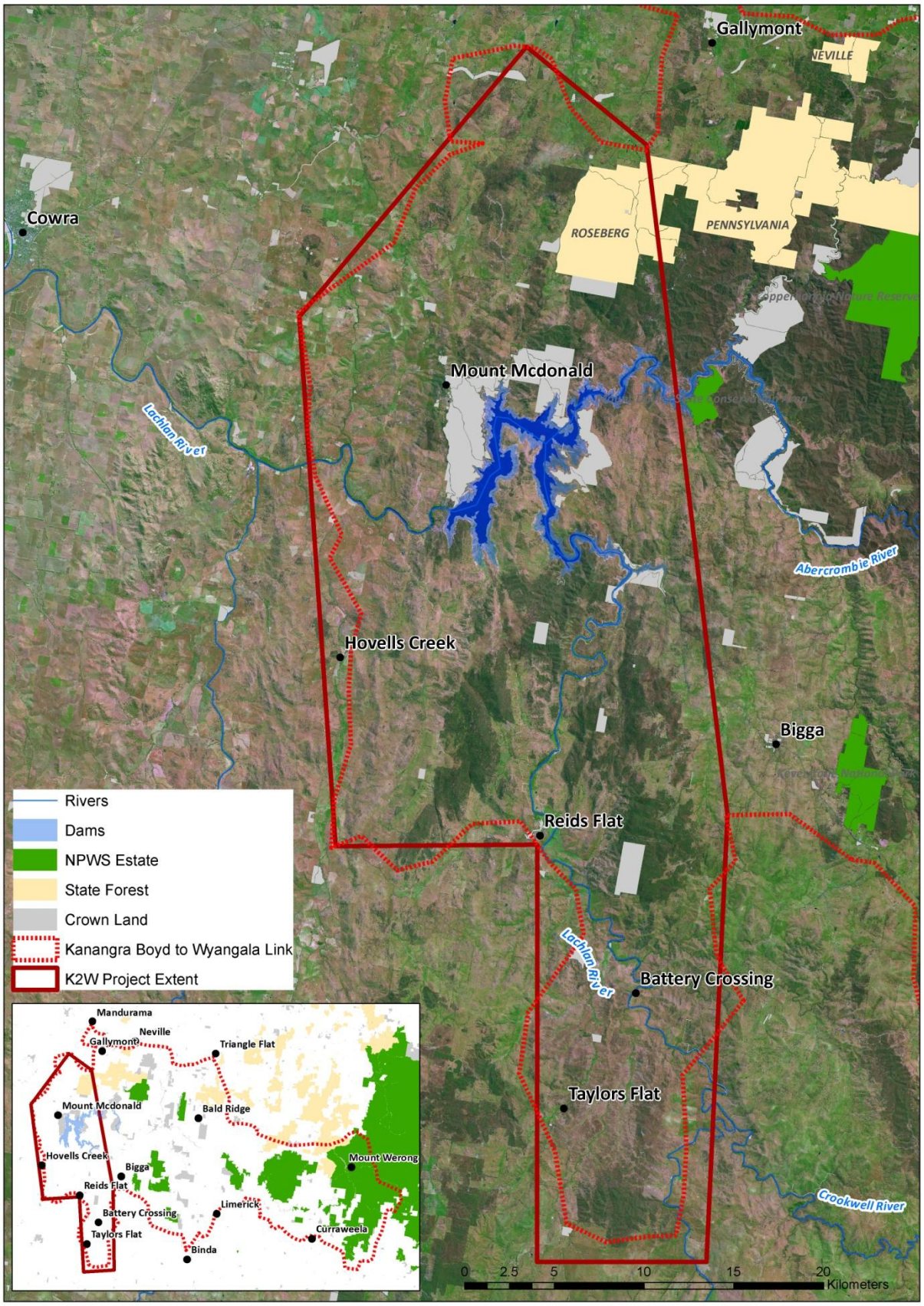


Figure 2. Hovells Creek Landcare project area within the Kanangra to Wyangala (K2W) Corridor

About the K2W Corridor

The K2W Corridor is a significant western projection of the Great Eastern Ranges, between the Greater Blue Mountains World Heritage Area and the hilly country around Wyangala Dam (near Cowra) in the upper reaches of the Lachlan River catchment of New South Wales.

The area includes several significant public protected areas including the Kanangra-Boyd and Abercrombie River National Parks, Abercrombie Kaarst Conservation Area, Copperhania Nature Reserve and the Wyangala State Recreation Area, linked by private conservation areas, forested areas (including the Roseberg and Pennsylvania State Forests) and cleared lands used for farming and grazing.

Vegetation along the length of the corridor forms a natural altitudinal gradient, with habitats trending from mixed wet and dry sclerophyll forest in the east, through dry sclerophyll forest which forms the core of the corridor across the tablelands, to grassy woodlands on the hills surrounding Copperhania Nature Reserve and Wyangala Dam.

The K2W corridor provides habitat and migratory pathways for a particularly diverse range of native plants and animals (www.greateasternranges.org.au). It forms a major connection between eastern/coastal and inland migratory species flyways, making it a landscape of significance common to NSW, the ACT and Victoria.

Why is the Kanangra-Boyd to Wyangala Corridor important?

The K2W Corridor contributes to local species dispersal and climate change adaptation potential, and provides a critical connection for national scale bird migrations into and out of public and private protected areas comprising the Greater Blue Mountains World Heritage Area. Lands adjoining protected areas in the landscape are vital for integrated threat management to ensure that increased connectivity of landscapes linking protected areas do not place damaging pressures on World Heritage values. In late 2009, the GERI commissioned a series of projects to map the 'big picture' values at 'whole of GERI' scale, including mapping bird migration routes, drought and fire refuge areas, habitat connectivity and vegetation condition. These analyses demonstrate the importance of the K2W corridor for a number of reasons:

Bird migration patterns – The Great Eastern Ranges and woodlands of the inland slopes form a major network of habitats that support altitudinal and latitudinal seasonal migrants, nomadic movement patterns and seasonal dispersal of juveniles. The K2W corridor provides an important east-west connection between the main range and a major node in the 'western woodlands way' comprised by Copperhania Nature Reserve and the Wyangala State Recreation Area.

Drought refuge – Drought refuge was mapped by analysing satellite imagery to identify parts of the landscape which remain consistently more moist than surrounding areas under a variety of seasons over a 10 year period (Mackey and Hugh 2010). Seasonal movement patterns observed over a number of years highlight the important role of drought refuge zones as core areas used by birds to facilitate movement under a range of seasonal conditions.

Habitat connectivity – Potential habitat connectivity has been modelled at several scales from continental (major connections across Queensland, NSW, the ACT and Victoria) to State and also regional. These models revealed how protected areas within and near the Great Eastern Ranges are

linked, creating a network of habitats. These connections reflect the general patterns of movement by birds within and between core habitat areas comprised of National Parks, vegetated ridgeline systems and drought refuge areas. Connections between the ranges and inland woodlands, combined with the north-south network formed by western woodlands, highlight the significant potential for continued connectivity between the ranges and western habitats.

Vegetation condition – Modelling of vegetation condition under current land use and predicted changes in 20 years demonstrate the potential for protected areas and other major habitat remnants to become increasingly isolated over time, with loss of connectivity resulting in 'island' effects within both the Great Eastern Ranges and western woodlands. The landscape connection between the Blue Mountains and western woodlands provided by the K2W corridor appears to have strong potential for loss of condition, potentially limiting species movements through the landscape, as well as degrading and isolating habitat for species resident in the corridor (Mackey et al. 2010).

The Lachlan (Kalare) Catchment Action Plan 2013 – 2023

In 2011 and 2012 the Lachlan Catchment Management Authority upgraded its Catchment Action Plan. From this body of work, Support Chapter 1 - The Lachlan Tablelands and the Technical Panel Workshop Notes have been useful in preparing this more localised plan. Where relevant, sections have been extracted to provide scientific information on changes, issues and actions. This also ensures that this local plan and its implementation aligns with the intent and desired outcomes of the Lachlan Catchment Action Plan 2013-2023.

How this Action Plan was developed

The steps in developing this action plan were to:

1. Organise and host a community workshop
2. Bring together information collected at the workshop
3. Review other existing information and plans for the area
4. Draft the action plan
5. Distribute the draft plan for comment; and
6. Finalise the plan

A community workshop was a major step in the Action Plan process. This workshop, with key regional stakeholders, identified conservation and habitat management issues within the project area and commenced the development of ideas to address these issues. The workshop was held at Wyangala Country Club on Thursday 19 September 2013 with thirty eight regional landholders, community representatives and technical stakeholders meeting to gather information, debate key issues and develop actions for the Action Plan. The workshop has been a key step in the development of the Plan for collectively implementing future conservation and habitat management works in the area. The steps at the workshop were:

1. Local knowledge mapping
2. Identifying important issues
3. Exploring issues
4. Identifying possible actions
5. Forming stakeholder teams

Following the workshop, other relevant reports have been reviewed and useful information extracted. Potential projects that reflect the workshop discussions using the latest available monitoring results and science have been identified. The early draft produced was circulated to workshop participants for feedback, refinement and additional projects.

The following discussion reflects the structure of the workshop and the community input on the day, along with additional information from published literature and the proposed projects that were identified post workshop. Where additional information has been used, the source of the data has been acknowledged.

Step 1 - Local knowledge mapping

One of the first tasks undertaken at the community and stakeholder workshop was detailing local knowledge of current landscape issues on aerial imagery of the area (Figure 3). The aim of this task was twofold: first to have the considerable background knowledge of workshop participants from the region out on the table for all participants to recognise and consider, and second, to engender a workshop atmosphere where participants from differing backgrounds and experience were able to work productively together. This background information has been collated within this report, but due to its detailed nature is held by Hovells Creek Landcare for future use rather than reproduced in full within.

Figure 3. Community participants debate and collate background knowledge on the K2W corridor at the Wyangala workshop.

Step 2 - Identifying important issues

Participants were asked to self select the key issues they perceived as changing in the K2W (western) landscape. The changes were written on post-it notes and placed by participants on a matrix sheet of small to large changes with small to large impacts (Figure 4). Group discussion reviewed the results, added additional issues and collated others, moved the status of some issues and finally, through a very interactive process, produced the matrix photographed below (reproduced in Table 1).

Figure 4. Workshop participants identifying key issues and the resulting matrix.

Table 1. Text version of the matrix produced while identifying important issues.

Small change/small impact	**Large change/small impact**
Group doing revegetation work Absentees land holders (Cowra shire) Grazing management increasing Serrated tussock on blocks Erosion increasing Noisy miner increase Managing mistletoe Lack of recruitment of young trees in existing stands of mature trees Increasing recreational use Increase in bird life in the landscape Positive Landcare works to restore landscape Positive 50 years of changing farm practices to improve soil structure and grazing management Wild dogs Grazing pressure on shrubs - ? impact on small birds Positive – return of wombats to the area Invasive feral animals Management of remnant areas – fire, feral animals	Increasing knowledge Increasing subdivision Coolatai grass invasion Increasing interest in Traditional Burning Decline in scatter paddock trees (including main pollinators) More seedling trees – revegetation since wet year and controlled regimes More trees and shrubs and birds Age of farmers and lack of succession and knowledge
Small change/large impact Balancing farm productivity and conservation issues Management of road corridors – or lack of it Feral animals Rubbish Cats Kangaroo population Loss of shrub and ground storey biodiversity Noxious weeks Tree regeneration	**Large change/large impact** Weeds Loss of mature paddock trees Tenure change • Subdivision of larger properties • Absentee small block holders • Impacting on fire, ferals, weeds Water turbidity Altered flows – loss of chain of ponds wetlands Wildlife impact on paddock trees Loss of paddock trees Death of older paddock trees – grazing pressure on new growth Loss of condition and structure in native vegetation Creek/river bank deterioration Increase in feral animals • Pigs • Cats • (and native over abundance) Pigs moving south and west to areas they have not been common before Significant increase in weed species • St John's Wort • Serrated tussock
Unknown amount of change or impact Significant impact on cultural sites (unknown change) Weeds now and spreading Feral animals	

Step 3 - Exploring issues

Workshop participants formed into groups to examine issues in more depth. This section outlines four issues that were identified as the most important:

1. Habitat management, revegetation and vegetation enhancement within the farm, riverine and ridge top zones
2. Weed management
3. Feral animals
4. Cultural heritage

Within the following sections, excerpts from the Lachlan Catchment Action Plan (2013-2023) Support Chapter 1 - The Lachlan Tablelands, have been added to provide additional information and background.

Figure 5. Workshop participants view each group's work following in-depth examination of issues

1. Habitat management, revegetation and vegetation enhancement within the farm, riverine and ridge top zones

Workshop participants considered revegetation, improving vegetation connectivity and enhancing the quality of native vegetation across three different zones, the farm zone, the riverine and the ridge top zone (Figure 6). Each with differing opportunities and needs for native vegetation work.

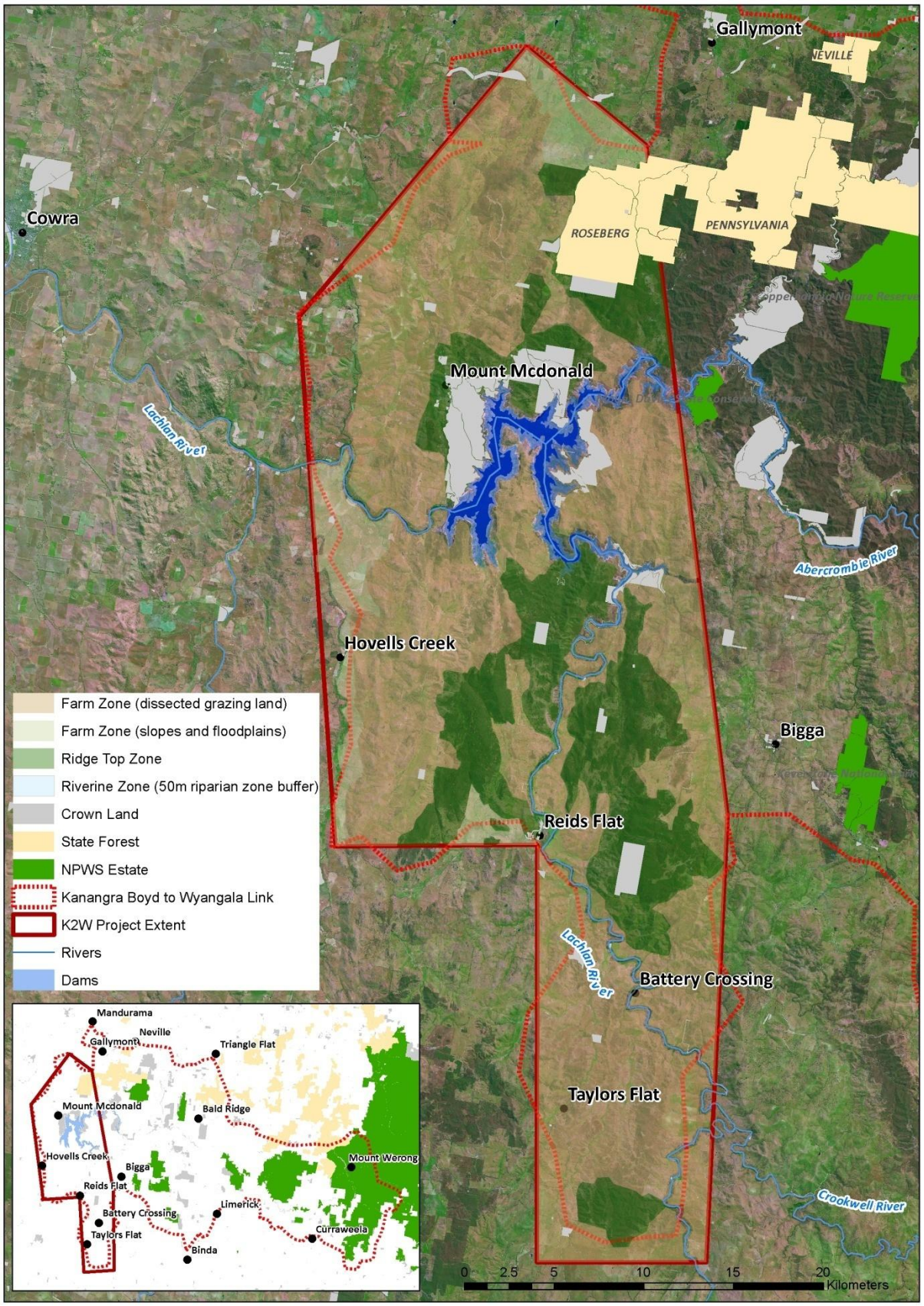


Figure 6. Derived from the knowledge mapping, this figure shows the farm, riverine and ridge top zones (Map courtesy of the Lachlan Catchment Management Authority - Cowra).

An example of these three zones is shown in the following west-east cross-section through the highest point, Mt Darling at 839m, in the western K2W landscape (Figure 7). This example transect is from Graham on Frogmore Road, through Mt Darling and Foggs Crossing on the Lachlan River, to a point just south west of Bigga (a distance of approximately 25 km) and intersects the key representative landforms in the region.

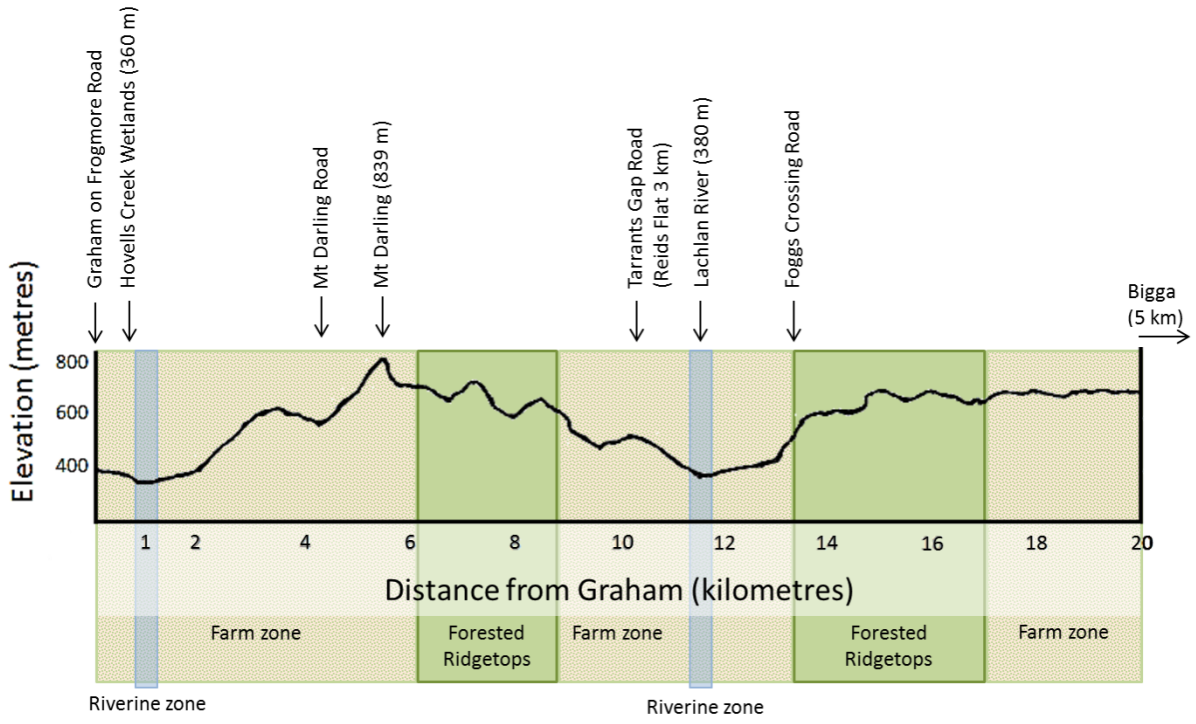


Figure 7. Cross section from Graham on Frogmore Road to Bigga reflects the topography and key vegetation zones of the western K2W landscape (note: elevation is enhanced by the scale used).

The Farm Zone

The farm zone comprises approximately 64 500 hectares or 62 percent of the western K2W corridor study area. It is used for grazing sheep (predominantly) and cattle, with some smaller landholders also grazing goats. The farm zone supports two distinct sub-zones; a deeply dissected steep and hilly upland area (approximately 58 400 ha) with (mainly) good remnant tree cover (one tree per hectare) and numerous clumps of more dense vegetation (Figure 8), and the lower slopes and floodplains (approximately 6 100 ha) used for more intensive grazing and cropping with fewer remaining paddock trees or remnant patches of vegetation >10 ha (Figure 9).

Figure 8. The farm zone - steep and hilly upland country

The upland area meets the Lachlan Catchment Action Plan tree density/connection guidelines (see excerpt below) while the slopes and floodplains fall short of those criteria. Paddock trees and remnant vegetation patches have multiple land use values as shade, shelter and feed for domestic livestock in addition to their value for reducing soil erosion, managing salinity, and as habitat for birds and other native wildlife. Fallen limbs and hollow logs provide habitat for reptiles and smaller native wildlife.

Figure 9. The farm zone on the lower slopes supports more intensive grazing and cropping

Grazing by sheep, cattle and kangaroos, coupled with competition from grassland species, limits the natural establishment of new trees and shrubs in the farm zone. The area has also been protected from fire through grazing which reduces fire loads, and through more direct fire control strategies (some tree and shrub species need fire or smoke to promote germination). Local Rural Fire Service crews work hard to protect this zone which hosts most of the regions farm infrastructure. Landholder revegetation projects in this zone need strong fencing and protection from grazing, including by kangaroos, for at least five years to be successful.

The preferred level of connection is a minimum 10 hectare patch every 1.5 km and a paddock tree every 100 metres (one tree per hectare). A pattern of connection that is less than this (smaller patches, larger distances) still provides valuable connection for a range of species. A pattern of connection that is more than this provides valuable connection for a larger range of species.

Lachlan Catchment Action Plan (2013-2023) Support Chapter 1 - The Lachlan Tablelands

The Lachlan CAP also identifies soil erosion as a significant issue in this landscape. The erosion mapping highlights areas around Wyangala Dam and within the K2W corridor as having soil erosion rates higher than 5 tonnes per hectare per year.

> Soil and associated soil organic matter loss from the Tablelands has been identified as a major contributor to turbidity, nutrient levels and the waterways. It is known that to protect soils from water erosion, groundcover levels need to be above 70%, with 75% having some buffer to threshold and being more desirable. However, results of the Lachlan CMA and OEH Catchment Condition Survey observed groundcover below 75% on 40% of sites surveyed in 2008. From 2009 to 2010 the survey observed groundcover below 75% on between 70% (autumn 2009) and 100% of sites (spring 2010). In 2011, approximately 25% of sites were observed below 75% groundcover. Increasing groundcover in this landscape is expected to reduce erosion, nutrient loading and salinity levels of the Lachlan River.
>
> At soil erosion rates of greater than 0.2 tonne per hectare per year, soil is being lost more quickly than replacement rates. At soil erosion rates of greater than one tonne per hectare per year, water quality is impacted. Rates greater than 5 tonnes per hectare per year are considered intolerable for production, particularly on shallower soils.
>
> Lachlan Catchment Action Plan (2013-2023) Support Chapter 1 - The Lachlan Tablelands

The following points provide an overview of the workshop discussion on the farm zone in the western K2W.

- Grazing is the predominant land use in this zone with some (minor) cropping on the flood plains and lower slopes.
- Protection and retention of living and dead trees
- Restoration is multi-purpose – production, biodiversity, aesthetics
- Define what outcomes for biodiversity – which species do we focus on?
- Education of importance of paddock trees and fallen limbs
- Replanting of paddock trees. Where? Which species? How? – Spacing for fauna movement
- Fencing around paddock trees and planting dense small patches (shrubs) around them as ‘stepping stones’
- Long-term plan to continually replant a small number of trees each year
- High cost of guards/fencing for paddock trees– is it better to replant scattered trees or fencing corridors

Possible actions

A number of possible actions were brainstormed by a group at the workshop. These were then sorted into actions that are already being done, that should be done and that could be done. All the workshop participants then voted for the action they thought most important to pursue.

Doing	**Should do**	**Could do**
Vision/goals of paddock trees 1 ●	Complementary paddock trees and guards 8 ● ● ● ● ● ● ● ●	Inventory of hollows in trees
	Retention of paddock trees/fallen timber 7 ● ● ● ● ● ● ●	Genetic diversity studies
	Education on the value of paddock trees/ multimedia 5 ● ● ● ● ●	
	Education on suitable grazing regimes 2 ● ●	
	Investigate fencing alternatives 2 ● ●	
	Central collection points for trees and guards 2 ● ●	
	Positioning of nest boxes	
	Describe where and what paddock trees Target areas, spacing, structure, species association	
	Define species of paddock trees	

Proposed projects and activities

The possible actions above range in capacity for the group of land managers and Landcare to undertake. Several actions require policy changes or research by State government. Building on the results of the workshop, and focusing on what can be done with limited or achievable levels of resourcing from external sources (i.e. grant funding) the following projects have been identified.

Action Task/Project	**Responsibility**	**Status/Timeframe**
Retain old(including dead) paddock trees and fallen limbs as bird/other wildlife habitat/nests	Landholders	
Establish farm based programs to replace older and introduce new paddock trees supported by strong livestock proof tree guards (plant a few trees every year)	Landholders, Landcare, CMA/LLS, GERI	Support through current Landcare programs
Protect and rehabilitate larger (> 10 ha) patches of remnant vegetation as wildlife habitat within farmland	Landholders, Landcare, CMA/LLS, GERI	Support through current Landcare programs
Establish new multi species/multi-purpose larger patches/tree-lines or whole of paddock regeneration within farmland	Landholders, Landcare, CMA/LLS, Greening Australia	Support through current Landcare/Greening Australia programs
Establish guidelines/landholder education materials for farm vegetation regeneration programs (including suitable species lists)	Landcare, CMA/LLS	
Group (bulk) purchase of trees, shrubs and fencing materials for regeneration projects	Landcare	Already practiced by Landcare Groups
Investigate voluntary conservation agreements and stewardship payment options for long-term protection of protected wildlife habitat on farmland	LachLandcare, GERI	Some current programs may be applicable (see Appendix 3)
Monitor use of the farm zone by migratory/other birds/ native wildlife	Woodland Bird Groups, OEH	

The Riverine Zone

The riverine zone is the smallest in area (approximately 1 150 ha or just over one percent of the total area) but is much more significant in context for bird and other wildlife welfare and for farm land use within the project zone. The background GERI studies referenced above notes the importance of the riverine zone as wildlife corridor and drought refuge. It is also arguably the zone under greatest environmental pressure (past and present) from commercial and recreational land use and from natural events such as flooding and erosion (Figure 10). Much of the floodplain land along the creeks and rivers was surveyed into 40 acre (16 ha) 'living areas' in the 1860s, and although most early settlers accumulated more than one block, the practice reflects the land use pressure this zone has been under for 150 plus years. Today, much of the riverine zone suffers from stream-bank erosion, limited regeneration and limited protection.

Figure 10. Flash flooding within the riverine zone poses a challenge for livestock production, cropping activity, waterway protection and regeneration projects.

Overall, the riverine areas within the project area are considered to be in fair to reasonable condition, based on the River Styles work reported in the Lachlan Catchment Action Plan. The K2W area includes a number of fish biodiversity hot spots where the abundance of native fish is high relative to the rest of the Tablelands. Despite this, declining water quality and turbidity downstream of the dam is an issue (including sediment which disrupts and add costs to town water supplies).

Today the riverine zone also includes the artificial shoreline around Wyangala Dam and while most of this shoreline is harder country less prone to erosion, it is subject to intensive recreational pressures.

The following points provide an overview of the workshop discussion on the riverine zone in the K2W area:

- Fencing of creek lines for tree and shrub regeneration of benefit for woodland birds
- Run-off issues from roads and extreme events such as flooding will present challenges for where and how to restore riverine areas
- Riverine areas are a key connection/refuge that could be used as a focus for increasing connectivity
- Lack of recruitment of *Allocasuarina* and shrubs i.e. *Bursaria*, *Leptospermum* (generally only River Red Gum recruitment occurring)
- Costs of livestock proof, flood-resistant fencing
- Balancing restoration with production by not reducing farming country significantly
- Promote biodiversity and production benefits of riverine restoration
- Regeneration works in the riverine zone especially in, or close to, creeks and river systems are subject to numerous regulatory controls – almost any works require a permit.

Possible actions

A number of possible actions were brainstormed by a group at the workshop. These were then sorted into actions that are already being done, that should be done and that could be done. All the workshop participants then voted for the action they thought most important to pursue.

Doing	**Should do**	**Could do**
Regeneration Shrubs 9 ● ● ● ● ● ● ● ● ●	Controlling carp and willows	Better strategies to manage water runoff from roads into water course
Important wildlife corridor 5 ● ● ● ● ●		

Proposed projects and activities

The possible actions range in capacity for the group of land managers and Landcare to undertake. Several actions require policy changes or research by State government. Building on the results of the workshop, and focussing on what can be done with limited or achievable levels of resourcing from external sources (i.e. grant funding) the following projects have been identified.

Action Task/Project	Responsibility	Status/Timeframe
Establish landholder based programs to replace older and introduce new riverbank trees/shrubs/ grasses supported by livestock/flood proof fencing (plant a few trees/shrubs every year)	Landholders, Landcare, CMA/LLS, GERI	Support through current Landcare programs
Establish guidelines/landholder education materials for riverine restoration programs (including suitable species lists, stream-bank erosion control and requisite permits required)	Landcare, CMA/LLS	
Repair erosion/gullies within waterways leading into the defined creeks and rivers of the zone	Landholders, Landcare, CMA/LLS	Limited funding available through current programs
Liaise with Shire Councils on problem road culverts and floodway's resulting in erosion on adjacent lands	Landholders, Landcare, Shire Councils	Discuss with local councils
Monitor use of the riverine zone by migratory/ other birds/native wildlife	Woodland Bird Groups, OEH	
Monitor water quality on-farm and in streams (fish/frog stocks/populations)	Landholders with support from Landcare, State Water	

The Ridge Top Zone - Forested Areas, Mt Darling Range and Botanical-Decca Range

The heavily wooded ridge tops of the Mt Darling and Botanical-Decca Range to the east of the Lachlan River valley (Figure 11) are prominent features of the western K2W landscape. They are dominated by mature remnant or regrowth vegetation, are difficult to access and though predominantly part of private landholdings are not used for farming to any extent. In many or most cases they are fenced to exclude entry by domestic livestock. They constitute approximately 26 000 ha or 25 percent of the western K2W project study area.

Figure 11. Forested ridge tops of the Mt Darling Range.

The following points provide an overview of the workshop discussion on ridge top areas within the K2W area:

- Access for fire management, weed and feral animal control
- Fire threat to adjoining grazing country and assets
- Management of fuel loads to reduce fire risk
- Lack of knowledge of costs and benefits of controlled burning of ridge tops
- Investigate impacts and benefits of control burns including bird/fauna surveys before and after
- Weed and feral animal control - pigs, blackberries, biological control?
- How important are the ridge tops as habitat for migratory species?

Possible actions

A number of possible actions were developed and sorted into actions that are already being done, that should be done and that could be done. All the workshop participants then voted for the action they thought most important to pursue.

Doing	Should do
Regeneration Shrubs 9 dots ● ● ● ● ● ● ● ● ●	Wildlife/bird surveys How important are they as habitat 6 dots ● ● ● ● ● ●
Important wildlife corridor 5 dots ● ● ● ● ●	Ridgeline access 2 dots ● ●
	Forested ridgelines Fire threat Investigate fire management strategies Cost/benefit 2 dots ● ●
	Pig control 2 dots ● ●
	Weed control Blackberries ? bio control 1 dot ●

Proposed projects and activities

The possible actions above range in capacity for the group of land managers and Landcare to undertake. Several actions require policy changes or research by State government. Building on the results of the workshop, and focusing on what can be done with limited or achievable levels of resourcing from external sources (i.e. grant funding) the following projects have been identified.

Action Task/Project	Responsibility	Status/Timeframe
Construct improved access trails for fire and land (weed, feral animal) management	Landholders, RFS, LHPA/LLS	
Evaluate use of the wooded ridgelines by migratory/other birds	Woodland Bird Groups, OEH	
Investigate controlled burns for fire management and shrub regeneration	RFS, LCMA/LLS	Possible fire planning workshop followed by cool fire trials
Feral animal and weed control	Landholders, LHPA/LLS	Extend bio-control program
Investigate voluntary conservation agreements and stewardship payment options for long-term protection of protected wildlife habitat on farmland	GERI, LachLandcare	Some current programs may be applicable (See Appendix 3)

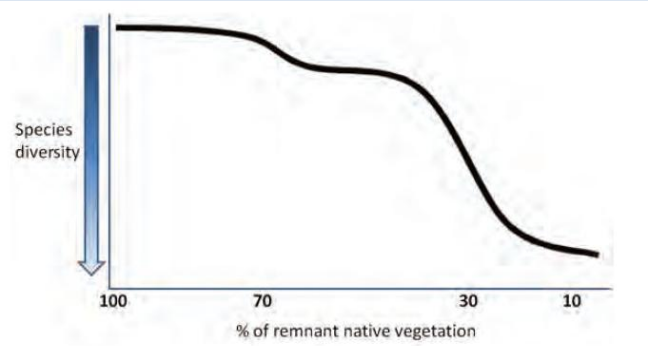
Figure 12. Workshop participants discussing K2W habitat management.

Recreating and enhancing connections is important to improve the resilience of the native fauna and flora to disturbances such as climate change, by enabling species movement and adaptation.

The remaining vegetation is generally in small patch sizes that exposes a large portion of the native vegetation to edge effects, reduces the ability of the native vegetation to withstand pressures and reduces its resilience. Different sized areas of remnant vegetation also provide different functions for different species. Generally, larger areas of structurally diverse native vegetation are required to provide appropriate habitat structures and support sub-populations of species. Small patch sizes limit the habitat values of the vegetation.

Smaller, scattered areas of native vegetation more frequently provide foraging space or connectivity between habitats. At the smallest scale of remnant vegetation, the isolated paddock tree, connectivity functions or movement is the primary ecosystem function. Approximately 95% of Australia's woodland birds can move through or forage through a landscape, to some extent, provided there is at least a paddock tree at every 100 metres. Marsupials such as sugar gliders require distances of around 65 to 75 metres. Paddock trees are also an important food resource for blossom feeding birds such as Superb Parrot and Regent Honeyeater. However, species dispersal over large distances does require more significant larger remnants within the matrix.

Diversity or a matrix of habitat structures is still required within these areas to promote the survival of a diversity of species. Grasslands are flora communities where grasses form the tallest dominant plant layer and trees or shrubs are either absent or sparse. If more than 50% of the vegetative cover consists of native grasses or herbs, the community is considered native grassland. Less than 1% of temperate grasslands remain in NSW and even derived grasslands are now declining in area and condition. Native grasslands are important habitat for a large number of threatened flora and fauna, including the Golden Sun Moth. Although information about appropriate grazing practices to manage native grasslands is limited, it is suggested that landholders maintain appropriate stocking rates during periods when grasses are not producing seed, employ non-continuous grazing, not apply fertiliser, and avoid drastic management changes to high quality sites.



Relationship between vegetation cover and species loss

There are three broadly recognised general thresholds based on the amount of remaining woody remnant vegetation and correlating observations of loss of species diversity, as shown in Figure 12. One of these thresholds is at around 30% of remnant vegetation. At this level of vegetation the curve of species diversity goes through a quicker decline. Overall, 21% of the Tablelands is remnant woody native vegetation. Of these 211 789 hectares of remnant vegetation in the Tablelands, 158 390 hectares occurs on private land and 53 399 on public land.

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2. Weed Management

The management of weeds in the western sector of the K2W corridor emerged as one of several critical habitat management 'hot topics' and the subject of significant discussion during the workshop. The following 'key issues and actions' were developed by a mixed group of landholders/managers and technical support personnel.

In the landscape there are weeds at different stages of invasion. There are weeds that are absent, emerging, widespread and native. In 2009 The Lachlan CMA developed a regional weed strategy. The strategy categorised weeds based on their level of infestation and identified recommended actions to minimise the economic, environmental, cultural and social impacts provided in the attachments to this plan.

Throughout the workshop a number of weeds were identified as impacting on the K2W area and as a concern of the participants. Coolatai Grass was identified as emerging with small outbreaks, especially along roadsides and in public access areas around Wyangala Dam. St John's Wort and Serrated Tussock were more common through the landscape and attempts were still being made (variably) to control and restrict the damage caused by these weeds.

The Lachlan CAP also identifies weeds as an issue in this landscape. An excerpt discussion on invasion pathways and implications for control is provided in Appendix 5.

The following points provide an overview of the workshop discussion on weeds in the K2W project area .

- Variable noxious status and reductions
- Communication
    - between agencies
    - within community
- Neighbours
    - lack of recognition
    - lack of knowledge
    - lack of action (if neighbours don't do anything, what's the point)
- Timing of control
- Lack of funding
    - more people on the ground and more power
    - 50% state, 50% local government funding source
    - Uneven funding distribution - grant process
- State Parks, hay/grain, livestock sources
- State Government review announced - NRC
- Non arable areas, little competition
- Buffer zone 40m from boundary (Boorowa area, variable)
- Vehicle hygiene, livestock quarantine
- Biological control and Integrated Pest Management

- Education
    - New landholders don't get information
    - No recognition or control
    - Weed Status clearance
- Raising revenue (political influence)
- Strengthen laws and prosecution
- Work for the dole (cheaper labour)

Possible actions

A number of possible actions were developed by the group. These were then sorted into actions that are already being done, that should be done and that could be done. All the workshop participants then voted with sticky dots for the actions they thought most important to pursue.

Doing	**Should do**	**Could do**
Education for new landholders and existing 6 ● ● ● ● ● ●	Biological control and IPM 6 ● ● ● ● ● ●	Turn weeds into feed research 2 ● ●
Ad hoc control	Revenue Political influences 5 ● ● ● ● ●	Drought lots
Grazing management	Cheap labour – Green Army, work for the dole 3 ● ● ●	Support to enhance equipment
	Weed status Clearance Laws purchase new land 2 ● ●	Weed resistance?
	Buffer zones 40m from boundary 1 ●	
	Subsidies for chemicals 1 ●	
	Bulk purchase chemicals 1●	
	Vehicle hygiene Livestock quarantine 1 ●	
	Contribute to NSW Govt review	
	Strengthen laws and prosecution	

Proposed projects and activities

The possible actions above range in capacity for the group of land managers and Landcare to undertake. Several actions require policy changes or research by State government. Building on the results of the workshop, and focusing on what can be done with limited or achievable levels of resourcing from external sources (e.g. grant funding) the following projects have been identified.

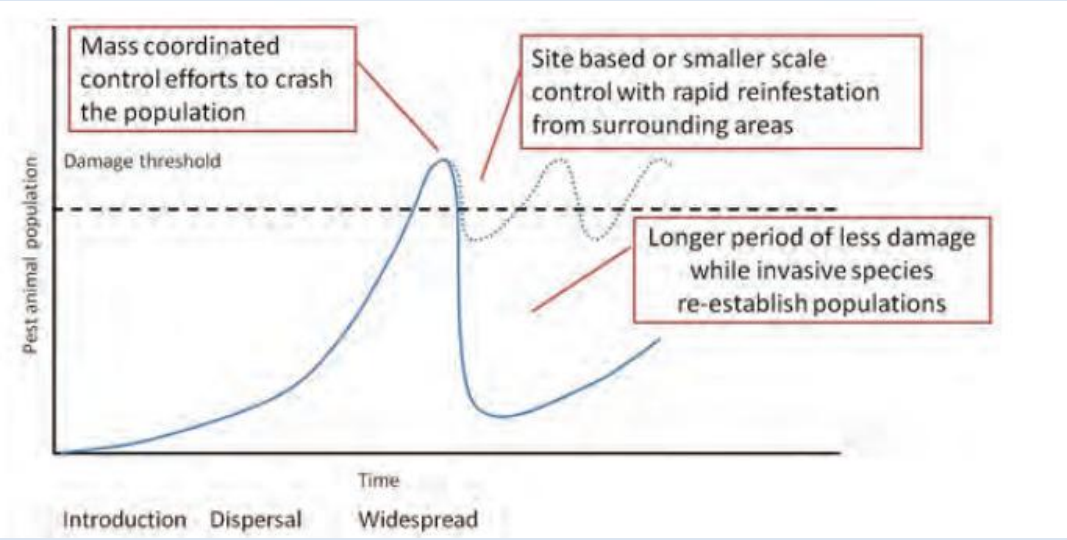
Action Task/Project	Responsibility	Status/Timeframe
Contribute submission on K2W weed issues to NRC review on weed management in NSW (inc. classification of weeds, funding for weed control & property weed status certificates)	Hovells Creek Landcare through LachLandcare and Landcare NSW	Done
Collaboration on regional bio-control program for critical weeds (for which bio-control measures are available)	Hovells Creek Landcare	Commenced
Education workshop on bio-control of weeds	HCLG/BCLG/ULL	In planning
Establish 'Tussock Tamer' program/s for Lachlan Valley landholders	Shire Councils, Landcare, State Parks, landholders	
Weed control advice for new / old landholders (inc blockies)	NSW Ag, Shire Councils (inc SSNPA)	
Coolatai Grass infestation on Foggs Crossing Road	Upper Lachlan Shire Council, Foggs Crossing Landcare	
On-farm weed hygiene inc. introduction of weeds through livestock purchases, feed grain and fodder: quarantine areas/drought feed lots	Farm and small block landholders	Current LCMA 'drought lot' funding program
Weed control along roadways and on public lands (inc. roadwork machinery hygiene)	Shire Councils, State Parks, LHPA/LLS	
Local coordination between neighbouring landholders to maintain common and joint buffer zones	Landholders – public and private	

3. Feral Animals

Throughout the workshop a number of pest animals of concern to participants were identified as impacting on the K2W habitat. They included cats, foxes and pigs. Feral pigs were of greatest concern and a 'hot topic' for discussion by the workshop participants. Rabbits have been a most significant problem pest in the past but are now controllable. In many respects these feral animal pests undergo similar invasion pathway as that described for weeds in Appendix 5.

In a regional pest animal strategy developed in 2006, the Lachlan CMA recognised that in the Lachlan landscape there are pest animals at different stages of invasion. There are pests that are absent, emerging, widespread and/or native to the region.

The timing of invasive species control and larger scale coordinated efforts is also significant in achieving meaningful results (see figure below). High rainfall years provide considerable resources to allow pest animals to thrive and cause damage. While land managers may have resources to apply control in these good production and income years, this is typically a poor ecological time to destroy populations of pest animals. Low rainfall years reduce breeding and suitability of habitat for pest animals, however in drought years, land managers are less likely to have resources to thoroughly control pests and opportunistically reduce populations further. There are significant opportunities to intervene and support land managers to further plummet already lowered invasive species populations if programs and funding are designed to respond flexibly to changing climatic conditions.



Graph showing potential gains from mass coordinated opportunistic pest animal control effects

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The following points provide an overview of the workshop discussion on feral animals, and feral pigs in particular. Two groups at the workshop looked at pest animal issues. The results of both groups are combined below.

- Issues
    - Cats, foxes, pigs, goats, rabbits, increasing in number
    - Predating on native animals, destroying vegetation, damaging property (fencing)
    - Disease vectors
    - High mobility (pigs)
- Damage to landscapes, vegetation/habitat
    - Grass, tree roots
    - Erosion potential
    - Fencing
    - Waterways and water points
- Damage to livestock
    - Potential for impacts on sheep i.e. Lambing ewes
    - Fencing damage
- Shooters and doggers
    - Some are responsible, some are not
    - Dogs disperse pigs making trapping difficult
- Impact on native wildlife
    - Pigs will eat anything
- Mobility of populations
    - Rapid increase and spread in population in good season
    - Disease vectors
- Fast-track pig specific poison bait (sodium nitrate)
- Bounty? Need to be nationwide
- Get government agencies i.e. NPWS to take their responsibilities seriously
- Need cooperative control programs that go across properties
- Need targeted control
- Manage foxes and rabbits together. Foxes predate on rabbits so if rabbits controlled foxes may increase predation on natives

Possible actions

Two groups at the workshop looked at the issue of pest animal. The results of both groups are provided below. A number of possible actions were brainstormed. These were then sorted into actions that are already being done, that should be done and that could be done. All the workshop participants then voted for the action they thought most important to pursue.

Doing	**Should do**	**Could do**
Integrated regional control program 8 ● ● ● ● ● ● ● ●	Sodium nitrite pig specific poison bait 12 ● ● ● ● ● ● ● ● ● ● ● ●	Panther – big bad wolf 2 ● ●
Shooting trapping baiting	Bio control for pigs 2 ● ●	Remote shooting via gun loaded drone non virtual game 2 ● ●
	Bounty 1 ●	Develop game meat market 1 ●
	Pig drives	Train SAS troops
	Enforce current laws, apply fines regularly	Pet food market
	More accountability by govt depts.	Game shoots Archery
		Tasty baits – irresistible
Shooting 6 ● ● ● ● ● ●	Should not dump cats 4 ● ● ● ●	Create bird houses
Baiting 4 ● ● ● ●	Electrify fences 3 ● ● ●	Sensor lights
Trapping 3 ● ● ●	Fence vegetation areas and regeneration areas 1 ●	Electrify fences
Maintain fences 1 ●	Use deterrents	Pig hunting
Locate and strengthen fences at entry points 1 ●	Keep grass trim – little vegetation	Ferreting
Inoculate pets against diseases	Should not feed wild animals	Use deterrents
	Destroy any present dens etc	Guard dogs
	Get the dogs on them	
	Fence up veggie patches	
	Secure poultry cages	
	Maintain fences	
	Shooting	
	Baiting	
	Trapping	

Proposed projects and activities

The possible actions above range in capacity for the group of land managers and Landcare to undertake. Several actions require policy changes or research by State government. Building on the results of the workshop, and focussing on what can be done with limited or achievable levels of resourcing from external sources (i.e. grant funding) the following projects have been identified.

Action Task/Project	Responsibility	Status/Timeframe
Lachlan Valley landholder regional collaboration on feral pig control, inc use of traps, hog hoppers, shooting. Assess need for additional hog hoppers.	Landholders, LHPA/LLS	Expand on program established by BCLG at Frogmore
Regional landholder collaboration on cat/fox/ rabbit control, inc BLCG coordinated fox control program	Landholders, LHPA, Landcare	Expand existing BCLG sponsored regional fox control program
Landholder community education on feral animal control strategies	LHPA/LLS, NSW Ag (feral animal program), Landcare	
Broader community education on impact of feral animals on native wildlife, inc dumping cats in rural areas	NSW Ag, Shire Councils, LHPA/LLS	
Monitor pig, fox, feral cat populations and control effectiveness	Possibly Landcare in collaboration with Feral Animals CRC	
Support evaluation of new pig specific baits	MSW Ag, Feral Animal CRC, LHPA/LLS	
Increase fines for persons caught deliberately releasing pigs into the wild	LHPA/LLS	

Figure 14. Workshop participants reviewed possible actions to address the key issues and affixed red dots to indicate priorities.

4. Cultural Heritage

Workshop participants recognised that the K2W landscape holds significant cultural heritage values. The natural resources, particularly the river systems would have been used by Aboriginal people in some way prior to European settlement. The loss of traditional land management practices such as traditional burning is seen by some to be having an impact on habitat condition and fire susceptibility of current landscapes. The following provides an overview of the workshop discussion.

- Traditional burning and understanding traditional land management practices
    - LCMA site in K2W (CFOC funded), 2 ha grassland with pit-fall traps and soil coring as site research
    - Concerns of continuation (uptake) by LLS
    - Maybe Lachlandcare and Lachlan Aboriginal Advisory Group and Traditional Ecological Knowledge (TEK) Men's Group to approach LLS Board
        - TEK Men's Group
            - Established in Cowra
            - Empowered (in the long-term to capture traditional knowledge.
            - Cowra Council looking to establish a business model to support the group
            - RFS training encouraged to establish TB groups
            - Need to consult/establish protocol to work with Aboriginal Lands Councils, Traditional Owner Groups
    - LCMA Funding Victor Steffensen - walk and talk (from Gulf of Carpentaria)
    - Increase community consultation and awareness raising with landholders
    - Address separate issues - grazing management, vegetation (remnant and revegetation) management and weed control (certain birds rely on TB to survive - ripple effect)
- Mapping/telling story of landscape (cultural values)
    - What's been done?
    - Hearing from other farmers about working with Aboriginal community, benefits and WIIFM
    - Artistically documenting learning process
- Process to engage Traditional owners (and others) in consultation and information sharing
- On-ground works - Restoration and Revegetation
    - Establish Traditional Burning sites within K2W
    - Establish TEK calendar to include traditional use of species
    - K2W astronomy tour and canoe trip (adults, schools, youth leaders)

Aboriginal Cultural Philosophy

Possible actions

A number of possible actions were brainstormed by a group at the workshop. These were then sorted into actions that are already being done, that should be done and that could be done. All the workshop participants then voted for the action they thought most important to pursue.

Doing	Should do	Could do
River dreaming canoe trips	Mapping cultural values for shared learning (ID and assessment) 9 ● ● ● ● ● ● ● ● ●	Expand for rest of K2W
Consultation	K2W astronomy tour (overnight) and canoe trip and Traditional Ecological Knowledge and Traditional Burning 8 ● ● ● ● ● ● ● ●	
Traditional burning site – 1 only in the K2W	Traditional ecological knowledge calendar template 5 ● ● ● ● ●	
	Case studies from farmers showcasing their work with Aboriginal communities to protect cultural assets on farm 3 ● ● ●	
	Traditional astronomy school workshop 1 ●	
	Small group visits to reconnect with significant cultural sites 1 ●	
	Document farmers rights in respect to cultural assets and opportunities to collaborate for preservation and shared learning	
	Workshop – Aboriginal cultural philosophy	
	1 day workshop with farmers on Aboriginal cultural philosophy and site visits	
	Establish more traditional burning sites in K2W	

Proposed projects and activities

The possible actions above range in capacity for the group of land managers and Landcare to undertake. Several actions require policy changes or research by State government. Building on the results of the workshop, and focusing on what can be done with limited or achievable levels of resourcing from external sources (e.g. grant funding) the following projects have been identified.

Following the Wyangala workshop GERI brought key cultural heritage stakeholders together to develop a 'Cultural Connections' program to progress many of the initiatives embodied in this section of the Action Plan across the K2W corridor as a whole.

Action Task/Project	Responsibility	Status/Timeframe
Community presentations on traditional astronomy (Landcare, schools, State parks)	Lachlan Aboriginal Advisory Group	To be embodied in new GERI sponsored Cultural Connections program
Community presentations on traditional ecological knowledge/calendars, aboriginal cultural philosophy (Landcare, schools)	Lachlan Aboriginal Advisory Group, Geri Cultural Connections program	To be embodied in new GERI sponsored Cultural Connections program
Collaborative action to protect aboriginal cultural assets on farm land		To be embodied in new GERI sponsored Cultural Connections program
River Dreaming and Aboriginal astronomy pilot project	GERI – K2W	Dec 2013
Integration of traditional burning knowledge with controlled burning/wildfire mitigation plans for the wooded ridgeline zone	LCMA/LLS, RFS, Cowra Council, Landcare Groups	Bill Gamage at Cowra in 2014, To be embodied in new GERI sponsored Cultural Connections program

Figure 15. Discussing Aboriginal cultural heritage at the workshop

Other issues discussed

The workshop discussion also raised two other issues that were not developed into in greater detail.

Small blockies

Challenges at engaging and coordinating amongst a number of small block holders, particularly those that are absentee landholders. There are some enthusiastic and passionate small block holders in the area and encouragement and assistance for these individuals is needed. Where possible, funding to support the education, skill development and coordination of pest and weed control on small blocks will be sought.

Recreational users

The increasing recreational use of Wyangala Dam and the adjoining State Parks was seen as both a positive and negative. Signage to create awareness of issues such as weeds and dumping of cats was discussed as one way to increase visitor responsibility. Opportunities to have presentations and campfire talks around peak visitor periods may present and will be taken.

Step 4 - Forming stakeholder teams

In the final session at the workshop participants formed (self selected) teams of similar land managers. In these teams the common strengths or the team strategy, possible actions and areas where further assistance may be required were identified. The session aimed to highlight areas where the skills and resources are available within the collective, and motivate working both within stakeholder groups and across stakeholder groups. The results of the discussion are summarised below.

The Weed Warriors

Team strategy: To keep going!

Strengths/team strategy	What we can do	Help
• Knowledge/education • Sense of purpose • Authority	• Action plan for weeds • Look into grants/funding • Monitor and map • Ensure buffer zones • Monitor stock/vehicle movement • Talk to neighbours • Regeneration • Awareness	• Landcare • Local council • Funding increase

Can't Do Everything's, Can Be Leaders

Team strategy: Maintain and improve land for which we are responsible.

Strengths/team strategy	What we can do	Help

• Weeds
  ○ Lower cost/higher effectiveness
  ○ Community approach and government lobbying
  ○ Maintain current action
• Ferals
  ○ Lower cost/higher effectiveness
  ○ Community approach and government lobbying
  ○ Maintain current action
• Biodiversity
  ○ Tree lanes and paddock trees to build connectivity, incorporating farm plans, remnant vegetation fencing
  ○ Green fire-wall (casuarina, kurrajong)
  ○ Identify key species to minimise fragmentation
• Viable business
  ○ Define own economic threshold for pests, weeds, biodiversity
	• Actions: Apply for funding for:
	  ○ Remnant vegetation fencing
	  ○ lower cost bulk purchased/subsidised chemicals
	  ○ Biological control species distribution
	  ○ Paddock tree connections/cluster connections
	  ○ Control ferals
	  ○ Stewardship payment for existing remnant management
		• Community approach to issues
		• Go to agencies with our proposals costed

Small and Absent

Team strategy: Work with our neighbours.

Strengths/team strategy	What we can do	Help

• Enthusiasm, time (retirees) and technical skills	• Collaborate with neighbours on:
	  ○ Fire management
	  ○ Weed control
	  ○ Revegetation
		• Agreement on working together
		• Funding for weed control
		• Fire management
		• Weed control
		• Revegetation
		• Increasing biodiversity

Coordinators and Facilitators (Cockie's and Cattle Dogs)

Team strategy: Talk, share knowledge, create networks and round people up.

Strengths/team strategy	What we can do	Help

• Existing network of landholders/Landcare groups/production groups (Communication channels)
• Access to expertise and resources
• Facilitation skills - including consultation with Aboriginal community
• Community engagement and knowing who's who. Understanding protocols - Aboriginal community
• Assist with lobbying
	• Disseminate K2W workshop info/objectives
	• Facilitate/organise K2W Astronomy workshop
	• Assist landholders/groups to develop projects and seek funding e.g. weeds council, LHPA
	• Promoting outcomes
	• Support the development of case studies and fact sheets i.e. Farmers legal rights and obligations (cultural heritage)
	• Relevant training and education
		• Wherever it's needed
		• Landcare
		  ○ Heather McLeod (Boorowa)
		  ○ Mary Bonet (Upper Lachlan)
		  ○ Vanessa Cain (Mid Lachlan)
		  ○ Leanne Leihn (Lachlandcare)
		  ○ Gus Arnott (LCMA Cowra)
		  ○ Larry Towney (Lachlan Aboriginal Community Support)

Technical Support

Team strategy: To provide advice and support

Strengths/team strategy	What we can do	Help
• Wildlife/habitat requirements (structure/connectivity) • Monitoring and assessment • Recommendations/guidance • Access to resources / expertise • Community education - local and broader area	• Identify priority sites • Recommend habitat management / enhancement • Implementation of monitoring	• Funding to do the above • Time to do the work

A background paper for GER, Morrison et al. (2011) defined five key landholder groups (not including public landholders) within the Southern Highlands and Tablelands of NSW that included parts of the K2W corridor. The study identified what each group's interest was in conservation and land management and how to most effectively engage with them. The five groups identified by Morrison et al. (2011) and their conservation/land management interests included:

- Professional lifestylers - high environment and NRM interests
- Retiree lifestylers - medium to high environment and NRM interests
- Blue collar blockies - low environment and NRM interests
- Quality operators (leading farmers) - a wide range of NRM interests
- Traditional farmers - low environment and NRM interests

All groups engaged with their local Rural Fire Service units and to varying degrees local community, sports and/or Landcare Groups. Access to information by way of newspapers, the internet and field days or contact with neighbours also varied. While the retiree landholders and full time farmers were resident landholders, the professional lifestylers and blue collar blockies invariably worked away from their land for their main source of income. All groups supported Landcare, Greening Australia and/or CMA's for management of local conservation and NRM programs.

The characteristics of groups defined by Morrison et al. (2011) is reflected within the groups who self selected at the Wyangala workshop with the addition of community and technical support.

Within the HCLG K2W project area we have identified the following properties:

- 587 properties of < 50 ha, mainly owned by lifestylers, many of whom are non-residents
- 335properties of between 50 and 500 ha, comprising a range of lifestylers, and part-time farmer residents who supplement their incomes off farm
- 76 properties > 500 ha comprising mainly resident, full-time farmers, some of whom own several properties, or non-resident professionals who engage local farm managers

Local Landcare groups, such as Hovells Creek Landcare can play a key role in engaging with each of these landholder groups, noting that each group of landholders may have different NRM interests, varying information and communication requirements and differing predilection for community involvement.

GERI, the CMA/LLS and other responsible land management agencies can reasonably engage with all or most of the 76 larger property landholders, and through group strategies with many of the 335 medium sized property landholders and 587 blockies who are residents.

However, GERI, Landcare and government land management agencies such as the CMA/LLS may need the cooperation of local councils to communicate with the many absentee blockies through their land rating databases and regional newsletters.

Improved interaction between the public and private land managers would assist meeting GERI's objectives for the K2W corridor.

Action Plan Governance

This plan has been developed by Hovells Creek Landcare with sponsorship of the Great Eastern Ranges Initiative and in consultation with a wide range of Kanangra-Boyd to Wyangala Corridor stakeholders in the best interest of natural resource management in the region. While HCLG will be the nominal custodian of the plan, it will be freely available for reference by GERI sponsors, Landcare Groups and members, and other groups and individuals alike. HCLG expects that the plan have a three year lifespan but may be reviewed and amended as appropriate annually.

Project management/governance within the Hovells Creek Landcare Group

The following (externally funded) project management practices are followed at Hovells Creek Landcare.

- Regional Landcare needs, opportunities for external funding and project application processes/timelines are discussed regularly at HCLG meetings.
- The Group has focused on direct funding application for smaller, more manageable (within current volunteer resources) projects, though has expressed support for larger collaborative projects with other regional groups where project management funding support can be accommodated within the project budget.
- Individual landholder members develop their on-farm plans and budgets utilising Group owned Phoenix property mapping software, Excel budgets, the application guidelines (including what will and will not be funded) and external technical advice as appropriate. Landholder members are expected to contribute, at least in kind or by means of labour, to projects.
- The Group appoints a project manager to develop the application, negotiate proposed works and budgets with members and final submission through the HCLG Chairperson by the nominated deadlines.
- Separate bank accounts are established for successful projects and funds managed through the Chairperson, the Treasurer, the Project Manager and regular reporting back at each (bi-monthly) Group meeting.
- The nominated project manager monitors on farm project activity, advises on any problems encountered, reports project progress back to the Group and prepared project milestone reports for submission to the external funding authority through the Chairperson,
- As appropriate, the project manager negotiates group purchase of trees/shrubs, fencing and other project materials at 'bulk' supply rates.
- During the course of a project the Group organises on-farm visits for members and associates to see first-hand the work being undertaken, to learn from the experience of others and to discuss implementation problems etc.
- Towards the conclusion of a project, the project manager inspects work undertaken, discusses any outstanding tasks i.e. inability to plant trees as scheduled because of dry weather, and either negotiates a project extension, or prepares a final report for submission through the Group Chairperson.
- Group project accounts are audited through a regional accounting firm.

- Any residual funds are either refunded to the funding agency, or by agreement allocated to other Group Landcare activities.
- The Group is developing its website to be able to better publically report its on-ground activities, especially those that are publically funded.

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Appendix 1. Threatened species and bird migration

Table 1. Threatened species of Fauna and Flora within the K2W Corridor (NSW Government 2013)

FAUNA	SPECIES	HABITAT REQUIREMENTS
Amphibians	Sloane's Froglet	Shallow wetlands with low emergent vegetation
Birds	Spotted Harrier	Open grassland and large trees for nesting
	Little Eagle	Open grassland, scattered woodland and large trees for nesting
	Black Falcon	Open grassland and large trees including paddock trees for nesting
	Square-tailed Kite	Large patches of woodland with large trees for nesting
	Gang-gang Cockatoo	Forest and woodland with large hollow-bearing trees
	Glossy Black-Cockatoo	Forest and woodland with large hollow-bearing trees and stands of *Allocasuarina littoralis* foraging habitat
	Little Lorikeet	Woodland and paddock trees with nectar rich eucalypts and trees with hollows
	Swift Parrot	Forest, woodland and paddock trees with nectar rich eucalypts
	Turquoise Parrot	Woodland with hollow-bearing trees and paddocks with stumps and hollow bearing trees close to edge of woodland
	Superb Parrot	Woodland and open farmland with scattered paddock trees. Needs large old trees with hollows for breeding. Forages on native trees and shrubs and crops. Prefers to move along corridors of trees and shrubs
	Barking Owl	Large patches (>100 ha) of woodland with large trees that have hollows 20 cm wide or larger. Forage in open farmland
	Brown Treecreeper	Grassy woodland patches that are connected to other patches. Breeds in tree hollows and forages on dead fallen timber
	Speckled Warbler	Woodland with dense grassy areas and patches of shrubs
	Regent Honeyeater	Woodland and paddock trees with nectar rich eucalypts and some mistletoes – prefers larger trees for breeding and foraging
	Pied Honeyeater	Shrubby woodland and shrublands with nectar-bearing shrubs
	White-fronted Chat	Grassland, open farmland, shrubs
	Painted Honeyeater	Woodland with abundant mistletoes
	Black-chinned Honeyeater	Woodland and paddock trees with nectar rich eucalypts
	Grey-crowned Babbler	Open grassy Box-Gum and White Cypress Pine woodland with clumps of dense shrubs
	Varied Sittella	Open forest and woodland
	Gilbert's Whistler	Woodland with dense shrub layer
	Hooded Robin	Open grassy or shrubby woodland, edges of farmland Forages in areas with high levels of fallen dead timber
	Scarlet Robin	Open farmland with scattered areas of woodland
	Flame Robin	Open farmland with scattered areas of woodland
	Diamond Firetail	Native grassland and farmland close to patches of woodland

Mammals	Spotted-tailed Quoll	Forest and woodland with rock outcrops
	Koala	Forest with Scribbly Gum
Insects	Golden Sun Moth	Native grassland
FLORA	**SPECIES**	**HABITAT REQUIREMENTS**
	Silky Swainson-pea (*Swainsona sericea*)	Box-Gum and White Cypress Pine woodland

Bird Migration

Throughout Australia, many species of native birds undertake seasonal migration in order to follow changes in food availability, to return to breeding sites, or when juveniles disperse from their natal habitat. Seasonal migration may occur as regular and cyclical with predictable timing and destinations (Kirby et al. 2008) or as nomadic movement patterns that are irregular in timing, direction and distance (Morcombe 2003).

Seasonal bird migration occurs across a range of habitats throughout the landscape at various elevations and latitudes. For example, the Rainbow Bee-eater (*Merops ornatus*) is a widespread species found throughout mainland Australia. However during winter, populations from the south migrate to northern Australian in order to breed. Another species, the Regent Honeyeater (*Anthochaera phygia*) is known to be strongly nomadic, following food availability as trees come into flower (Morcombe 2003).

Figure 1. The Rainbow Bee-eater (*Merops ornatus*), is a seasonal migrant to northern Australia.

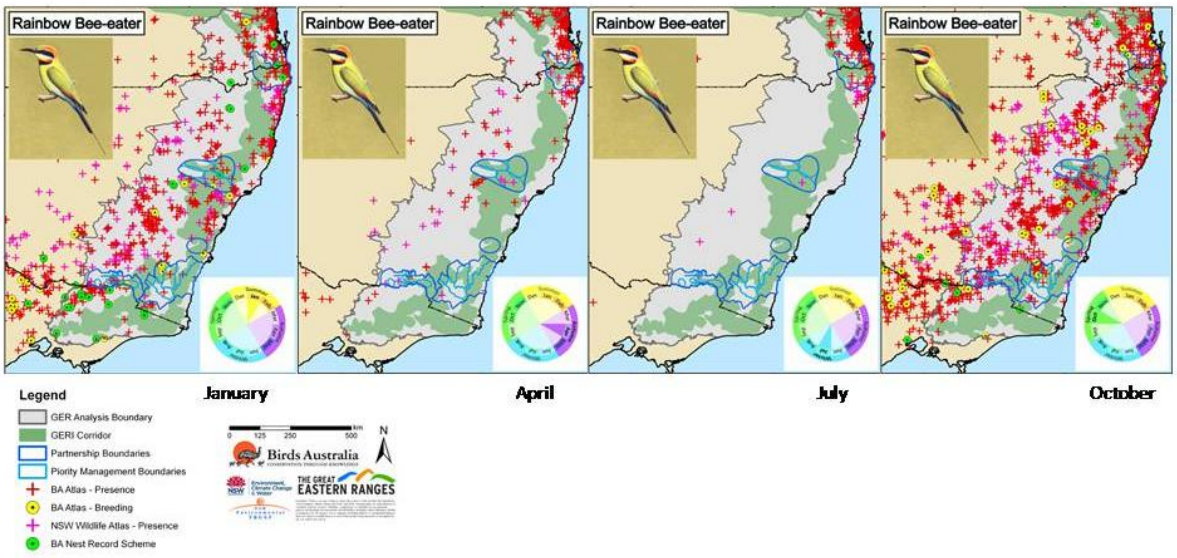

Figure 2. Seasonal movements of Rainbow Bee-eater (Great Eastern Ranges 2013)

Migrating birds rely on connectivity throughout the landscape in order to obtain all their resources. If the distance between patches of vegetation becomes too great due to habitat loss and fragmentation, a species ability to survive may be affected. Fragmentation can lead to limited dispersal and immigration rates directly affecting species populations. Reduced habitat fragment size can increase mortality rates through increased pressure from predators or competition from other species, or a combination of pressures on a species already suffering decline can then be subject to chance extinction, such as an extreme weather event or disease (Krebs 2001).

The Kanangra to Wyangala Corridor provides an important east-west link from the coast to the inland. Vegetation along its length varies from wet and dry sclerophyll forest in the east, through dry sclerophyll forest across the tablelands, to grassy woodlands on the inland slopes. The link that the corridor provides is important for supporting migratory bird patterns and will be critical in the future as species adapt to changing environmental effects.

The Great Eastern Ranges Initiative has produced a list of seasonal migratory birds using records from the Birdlife Australia Atlas and the NSW Wildlife Atlas. Observations for each month of the year have been plotted on a time-series map showing how each species moves throughout the year. The full list and maps can be viewed by visiting http://www.greateasternranges.org.au/bird-migration.

Appendix 2. Workshop participants and contributors

Name	Organisation
Muriel Abraham	Hovells Creek Landcare/Private landholder
Gus Arnott	Lachlan Catchment Management Authority
Lawrence Balcomb	Mid Lachlan Landcare
Mary Bonet	Upper Lachlan Landcare
Chris Braid	Private landholder
Jules Bros	National Parks and Wildlife Service
Daniel Cain	Lachlan Catchment Management Authority
Vanessa Cain	Mid Lachlan Landcare
Mary Constance	Private landholder
Jason Corcoran	Southern Slopes Noxious Plants Authority
Barry Gay	Hovells Creek Landcare/Private landholder
Nick Gay	Hovells Creek Landcare/Private landholder
Dylan Gower	Private landholder
Lyndal Hasselman	Earth Up Consulting
Gary Howling	Great Eastern Ranges/Office of Environment and Heritage
Michelle Hines	Lachlan Catchment Management Authority
Keith Hyde	Hovells Creek Landcare/Private landholder
Glenys Jones	Hovells Creek Landcare/Private landholder
Melanie Klootwijk	Forestry Corporation
Steve Laver	Hovells Creek Landcare/Private landholder
Leanne Leihn	LachLandcare
Heather McLeod	Boorowa Community Landcare
Bruce Nelson	Hovells Creek Landcare/Private landholder
Damon Oliver	Office of Environment and Heritage
Allison Pither	Grabine State Park
Sean Proudman	Foggs Crossing Landcare
John Rankin	Cowra Woodland Bird Group
Jayk Redman	Private landholder
Paige Redman	Private landholder
Gordon Refshauge	Hovells Creek Landcare/Private landholder
Trudi Refshauge	Hovells Creek Landcare/Private landholder
Tony Saunders	Crookwell Woodland Bird Group
Linda Southwell	Private landholder
Joe Thompson	Private landholder
Larry Towney	Lachlan Catchment Management Authority
Geoff Walker	Hovells Creek Landcare/Private landholder

Appendix 3. Farmland conservation stewardship and wildlife protection programs

Land for Wildlife

Land for Wildlife (LFW) is a voluntary property registration scheme that aims to assist landholders to maintain wildlife habitats on their land. Registration is free, non-binding, does not change the legal status of the property and all landholder information remains confidential. The LFW program is available to private landholders who have properties with half a hectare or more of native vegetation, and are willing to manage all or part of their property in an environmentally sustainable way.

The benefits of the program include putting landholders in touch with like-minded people including the opportunity to participate in workshops and receive up to date information via fact sheets and regular newsletters, contributing to improvement of biodiversity and providing wildlife with important habitat links across the landscape and improvements to farm productivity. LFW also provides free environmental property assessments.

For information on Land for Wildlife within K2W contact:

Mary Bonet - Upper Lachlan Landcare
Ph: 0459352892
Email: mary@upperlachlanlandcare.org.au
Web: www.cen.org.au

Conservation Agreements

Conservation agreements are voluntary joint agreements between landholders and the Minister for the Environment that provide permanent protection for special features on freehold land, Crown land (leased) and local council land. A conservation agreement may be entered into if you have:

- special features including native vegetation, wildlife habitat, Aboriginal sites and historic places on your property
- want your investment in the conservation of the area to be protected after you leave the property

For general information on conservation agreements, visit:
http://www.environment.nsw.gov.au/cpp/ConservationAgreements.htm

For information on Conservation Agreements within K2W contact:

Greg Stone - Woodlands Environmental Management
Ph: 48844255
Mobile: 0422279946
Email: woodlandsenvironmental@yahoo.com.au
Web: www.woodlandsenvironmental.com

Box Gum Grassy Woodland Environmental Stewardship Program

The Box Gum Grassy Woodland Environmental Stewardship Program aims to maintain and/or improve the condition and extent of critically endangered box gum grassy woodland ecological communities. Currently, these vegetation communities have been reduced to less than five per cent of their original extent and now occur as remnants on productive agricultural land.

The program offers long-term funding (up to 15 years) to private land managers in order for them to provide a range of agreed management activities to protect, rehabilitate and improve biodiversity on their properties. Funding rounds for Box Gum Grassy Woodlands were conducted during 2008-09 and 2009-10, resulting in the protection of almost 27 000 ha, including several sites within the western K2W corridor. A number of sites participating in the program are also involved in monitoring and evaluation conducted by the Australian National University.

For more information about future funding opportunities contact:

Environmental Stewardship Program
Ph: 1800607115
Email: envirostewardship@environment.gov.au
Web: www.nrm.gov.au

Greening Australia -Whole of Paddock Restoration (WOPR)

WOPR is an innovative approach to environmental restoration that incorporates production and conservation goals. Under the program, graziers volunteer a paddock of at least 10 ha for restoration and receive the support of stewardship payments to offset some of the production loss. Each paddock is rested from production for five years and locally native trees and shrubs are established by direct seeding. Trees are established in widely spaced belts on the contour returning around 25% of the paddock to deep-rooted perennial vegetation. Landholders sign up to a five year management agreement and after five years, the grazier can re-introduce stock to the paddock under a rotational grazing system.

The key benefits of this scheme include:

- Biodiversity reintroduction
- Carbon sequestration
- Salinity and erosion control

All of which can be achieved with little or no fencing costs.

The production benefits of WOPR include the return of groundcover and productive native perennial pastures. Many of the early movers in the scheme cite shade and shelter, reduced wind speed, and creation of a lambing and 'off-shears' paddock as their WOPR motivation. Seed pods and foliage from wattles can provide fodder, and soils are improved through increased nitrogen fixation and nutrient cycling.

For more information about future programs contact:
Graham Fifield - Greening Australia
Ph: 6253 3035
Email: wopr@greeningaustralia.org.au
Web: www.greeningaustralia.org.au

Appendix 4. Relevant excerpts on Invasive Species from the Lachlan Catchment Action Plan Support Chapter 1 - The Lachlan Tablelands.

For a pest or weed population to flourish, the pest must be introduced to a site and the habitat or conditions at that site must be favourable to allow the pest or weed to persist. In terms of plants, population changes for any species (native, introduced production plant, or weed) are dependent upon propagules, favourable sites, and allowing the plant to complete its lifecycle. If any of these factors are limiting at a site, then a weed can appear as an innocuous 'sleeper' species. Overgrazing or an unhealthy sward, opens up the grass canopy, creating openings for weeds and reducing resistance to invasion. A reinforcing loop occurs when weed cover (e.g. 20% weeds) concentrates livestock grazing on a smaller area of pasture (e.g. the remaining 80%), increasing overgrazing, weakening the pasture and making it vulnerable to weed establishment. Intact ecosystems may slow the invasion process, providing short term resilience to weeds, or in the longer term, act to repress.

Establishment occurs when over time, the area infested and the intensity of infestation increases with the population growth, and local dispersals increasing the scale of infestation from a site to a patch. Through time there is off-site dispersal and migration to new infestation sites. For weeds the dispersal may occur through wind, water, animals, and/or commerce.

Pest species undergo a similar invasion and establishment pathway.

The most opportune time to have a significant impact on invasive species is when the species is first introduced, is emerging or becoming established in the area and prior to the species becoming widespread. At this time the containment of the species can reduce the risk of further invasion and widespread establishment. Early detection and eradication of invasive species new to the area, is critical to prevention or delay of damage. Over time, unrestricted pests or weeds will eventually become widely spread through all favourable sites, adding to the invasive species already present and adding to the invasive species burden.

There are three thresholds that are crossed, each altering the amount of effort required to reduce the impacts of the invasive species.

• The first threshold is at the time of initial introduction of the invasive species. At this point, early detection and treatment can prevent the invasive species from establishing at the site of introduction, and eradication is a priority.

• The second threshold occurs when the initial infestation or the dispersal of the species to new infestation sites is so profound that it prevents eradication, and management of the invasive species shifts to containment.

• The third threshold occurs when the invasive species becomes widespread. Any local eradication is difficult to sustain due to ongoing reintroductions and reinvasions. At this point management shifts focus to minimising the damage done by the invasive species.

The pattern of establishment through to widespread is relatively predictable for some species. For example, serrated tussock takes about five years from introduction to become lightly scattered across a property. It then takes another ten years for the serrated tussock to become dense across the landscape. The addition of a functionally similar weed species to a landscape is not as troublesome as a new functionally different weed. For example, a new thistle in an area with several thistle species is not as difficult as a new toxic plant in an area with no toxic plants.

As a result of this pattern of establishment, invasion and reinvasion, and the ability of invasive species to move across property boundaries, a coordinated effort within a landscape is required to achieve results. This requires a range of land managers with varying skills and experience to work together.

In terms of minimising damage, the damage caused by invasive species varies pending the values affected. For example, Bathurst burr is a serious weed for the sheep industry and a minor weed for conservation, beef production and cropping. Land managers with differing values may have differing interests or willingness in control of various invasive species. Similarly, foxes cause more damage to sheep production than beef or cropping enterprises. The cost-benefit of controlling invasive species is different for different land managers. In the design of programs it may be necessary to recognise limitations of lesser experienced land managers and the shift in economic burden between types of land managers and production systems. Visitors to the area, such as recreational hunters, can also play a part in maintaining the biosecurity of the area and suppressing invasive species.

Lachlan Catchment Action Plan Support Chapter 1 The Lachlan Tablelands 2013-2023

Appendix 5. Relevant excerpts from the Lachlan Regional Weeds Strategy (2009).

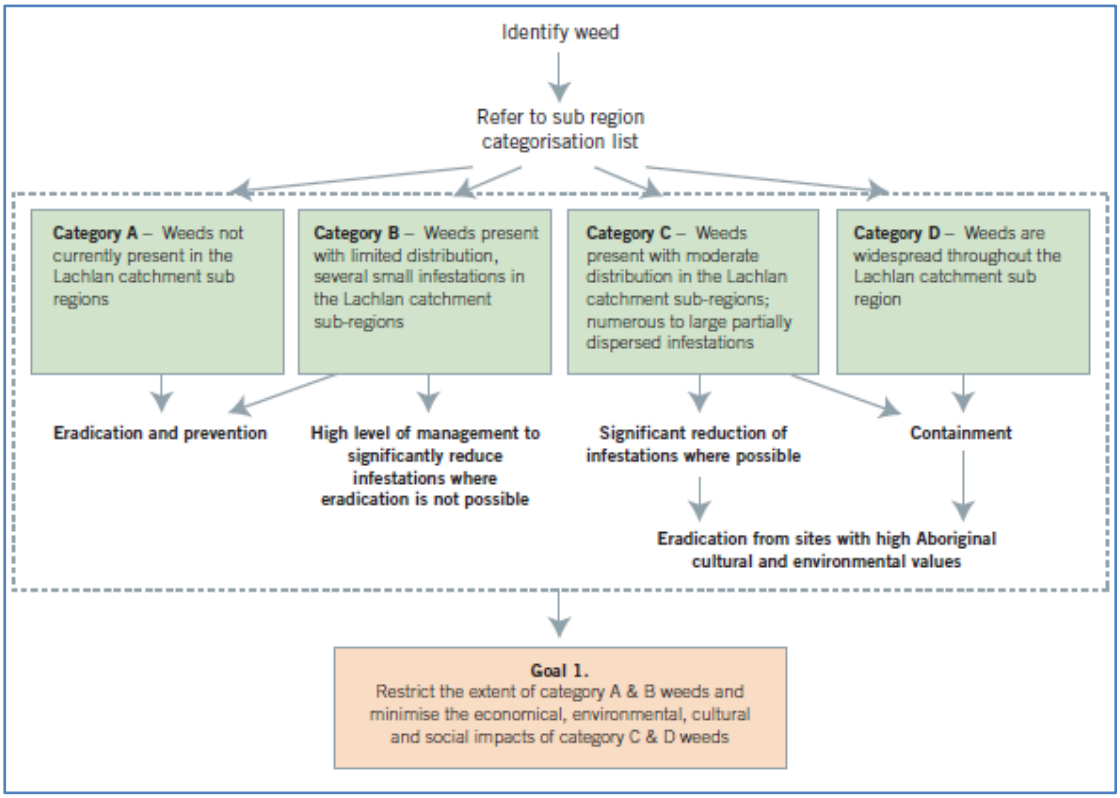

Figure 1. Framework showing coordinated strategic weed responses according to weed categorisation (Lachlan Regional Weeds Strategy 2009)

Table 1. Weed categories, desired control outcomes and recommended actions (Lachlan Regional Weeds Strategy 2009).

Category A – Weeds not currently present in the Lachlan catchment sub regions	
Recommended actions:	• Quarantine the area and remove infestations/plants within 7 days (species dependant) • Hold a spot field day with surrounding neighbours upon identification/finding • Report notifiable weeds to NSW I&I NSW • Widespread publicity using mass media: become proactive with established groups and increase awareness of the key features of these weeds during property inspections (LCAs) • Map and remove all infestations and monitor for re-emergence
Desired outcome:	Eradication and prevention

Category B – Weeds present with limited distribution, several small infestations in the Lachlan catchment sub-regions	
Recommended actions:	• Remove and/or isolate infestations using best practice management practices • Hold field days to focus on the distribution of the weed • Become proactive with established groups. Fact sheets to be made available stating what needs to be done and why it is needed. Increase awareness of the key features of these weeds during property inspections (LCAs) • Map and treat all infestations and monitor for re-emergence
Desired outcome:	Eradication or high level of management to significantly reduce infestations where eradication is not possible

Category C – Weeds present with moderate distribution in the Lachlan catchment sub-regions; numerous to large partially dispersed infestations	
Recommended actions:	• Infestations managed as per declaration status • Hygiene practices promoted to prevent further spread of the weed • Utilise local media and conduct field days during the main growing season • Map and treat all infestations and monitor for re-emergence
Desired outcome:	Significant reduction of infestations where possible or containment or eradication from sites with high Aboriginal cultural and environmental values

Category D – Weeds are widespread throughout the Lachlan catchment sub region	
Recommended actions:	• Incorporate into existing extension material and field days • Encourage containment of infestations • Promote hygiene practices to prevent further spread of the weed • Manage roadside infestation as per declaration and stipulation of LCA protocols
Desired outcome:	Containment or eradication from sites with high Aboriginal cultural and environmental values

Table 2. Categorised sub-region weed lists for this part of the catchment (Lachlan Regional Weeds Strategy 2009).

Upper Lachlan		WONS	NOX	CSP	INS
A – Weeds not currently present in the Upper Lachlan sub-region					
Alligator Weed	*Alternanthera philoxeroides*	■	■		
Parthenium Weed	*Parthenium hysterophorus*	■	■		
Prairie ground cherry	*Physalis viscosa*		■		
Sagittaria	*Sagittaria platyphylla*		■		
B – Weeds present with limited distribution, several small infestations in the Upper Lachlan sub-region					
Blue Heliotrope	*Heliotropium amplexicaule*		■		
Boneseed	*Chrysanthemoides monilifera*	■	■		
Brome	*Bromus sp*				
Buffalo Burr	*Solanum rostratum*		■		
Chilean Needle Grass	*Nassella neesiana*	■	■		
Coolatai Grass	*Hyparrhenia hirta*		■		
Date Palms	*Phoenix canariensis*				
Devils Rope	*Cylindropuntia imbricata*		■		
Fireweed	*Senecio madagascariensis*		■		
Gazania	*Gazania rigens*				
Golden Dodder	*Cuscuta campestris*		■		
Gorse	*Ulex europaeus*	■	■		
Green Cestrum	*Cestrum parqui*		■		
Hawthorn	*Crataegus monogyna*			■	
Hemlock	*Conium maculatum*		■		
Lippia	*Phyla sp*		■		
Mexican Poppy	*Argemone ochroleuca*		■		
Mimosa Bush	*Vachellia farnesiana*				
Olives	*Olea europaea*				
Osage Orange	*Maclura pomifera*				
Pampas grass	*Cortaderia sp*		■		
Pepper tree	*Schinus molle*				
Pepperleaf Senna	*Senna barclayana*				
Prickly Pear	*Cylindropuntia and Opuntia sp*		■		
Privet	*Ligustrum lucidum and sinense*		■		
Scotch Broom	*Cytisus scoparius*		■		
Spiny Emex	*Emex australis*		■		
Stattice	*Limonium sp*				
Tiger Pear	*Opuntia aurantiaca*		■		
Wards weed	*Carrichtera annua*				
Whiskey Grass	*Andropogon virginicus*				
Wild sage	*Salvia verbenaca*				
C – Weeds present with moderate distribution; numerous to large partially dispersed infestations in the Upper Lachlan sub-region					
African Boxthorn	*Lycium ferocissimum*		■		
African Lovegrass	*Eragrostis curvula*		■		
Bathurst Burr	*Xanthium spinosum*		■		
Blackberry	*Rubus fruticosus*	■	■	■	
Black Roly-Poly	*Sclerolaena muricata*				
Bridal Creeper	*Asparagus asparagoides*	■	■		

Cat Head	*Tribulus terrestris*				
Cobblers Peg	*Bidens sp*				
Cumbungi	*Typha sp (Native)*			■	
Devils Claw	*Proboscidea louisianica*		■		
Galvanised Burr	*Sclerolaena birchii*		■		
Horehound	*Marrubium vulgare*		■		
Johnson Grass	*Sorghum halopense*		■		
Khaki Weed	*Alternanthera pungens*		■		
Narrawa Burr	*Solanum cinereum*				
Noogoora Burr	*Xanthium occidentale*		■		
Onion Weed	*Asphodelus fistulosus*		■		
Paddy Melon	*Cucumis myriocarpus*				
Phalaris	*Phalaris aquatica*				
Pines	*Pinus spp*			■	
Scotch Thistle	*Onopordum acanthium*		■		
Serrated Tussock	*Nassella trichotoma*	■	■		
Sifton Bush	*Cassinia arcuata*		■		■
Silverleaf Nightshade	*Solanum elaeagnifolium*		■		
Spiny Burrgrass	*Cenchrus incertus and longispinus*		■		
St Johns Wort	*Hypericum perforatum*		■		
Sweet Briar	*Rosa rubiginosa*		■	■	
Thornapple	*Datura stramonium*				
Tree of Heaven	*Ailanthus altissima*		■		
Turnip weed	*Rapistrum rugosum*				
White Heliotrope	*Heliotropium europaeum*				
Wild Radish	*Raphanus rahanistrum*		■		
Willows	*Salix sp*	■	■	■	
D – Weeds are widespread throughout the Upper Lachlan sub-region					
Barley Grass	*Hordeum leporinum*				
Capeweed	*Arctotheca calendula*				
Paterson's Curse	*Echium plantagineum*		■		
Rye Grass	*Lolium rigidum*				
Saffron Thistle	*Carthamus lanatus*				
Wild Oats	*Avena fatua*				