



NSW Department of Primary Industries
Office of Environment & Heritage

NSW Catchment Management Authorities
NSW National Parks & Wildlife Service

Australian Government

BIODIVERSITY PRIORITIES FOR WIDESPREAD WEEDS

Central West CMA region

Part B

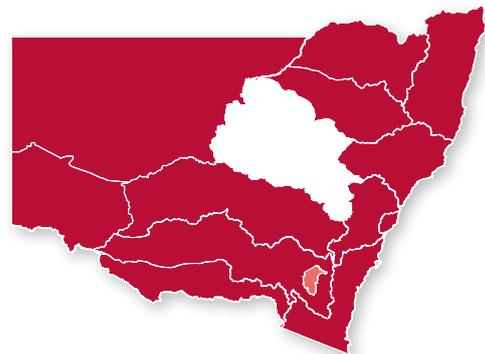


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B1. INTRODUCTION

This is one of the 13 regional documents that sit under the *Biodiversity priorities for widespread weeds - statewide framework*. It provides information for the Central West Catchment Management Authority (CWCMA) region. The *statewide framework* should be read in conjunction with this document as it provides (i) background information, (ii) objectives of the project, (iii) the standardised methodology used to establish regional priorities and (iv) guidance on implementing the priorities.

The overarching document to this report, the *statewide framework*, documents the process used for identifying biodiversity (biological assets) at risk from widespread weeds in New South Wales, as well as prioritising sites for weed control in each CMA region. This sub-report (Part B) establishes regional priorities, in the form of priority widespread weeds and priority sites for control, in the CWCMA region.

The CWCMA region covers an area of approximately 92,000 square kilometres and is home to approximately 240,000 people. The region possesses a wide diversity of landforms, plant and animal species and vegetation communities including forests, temperate and semi-arid woodlands, wetlands, shrublands, heaths and grasslands (CWCMA 2008). Since European settlement clearing, and subsequent degradation, native vegetation is largely restricted to a number of small isolated remnants on poor soils. For example, the Box and Ironbark Woodlands which originally occupied large parts of the slopes and plains have been reduced by as much as 90%, and are now among the most significantly altered plant communities in New South Wales (CWCMA 2008).

Invasive plants and animals are recognised as a key threat to sustainability of the region's natural resources. Weeds pose a significant threat to biodiversity by directly impacting growth and survival of native flora and fauna and via indirect effects on other aspects of landscape health, e.g. water quality. A review of the impact of weeds on threatened biodiversity in New South Wales (i.e. species, populations and ecological communities listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act)) indicated that 59 weeds in the CWCMA region were threatening biodiversity, including 28 threatened plant and animal species (Coutts-Smith and Downey 2006).

This project builds on the existing regional weed strategies by considering the impact of all widespread weeds present in the CWCMA region on biodiversity, regardless of their legislative listing. Given many widespread weeds are unlikely to be extensively controlled or eradicated, this project provides strategic management options for protection of biological assets by identifying the priority widespread weeds, the biodiversity impacted and priority sites for control.

To reduce the impact of widespread weeds on biological assets, control programs need to be prioritised to areas where control is both achievable and likely to have the greatest benefit to native biodiversity, independent of land tenure. Such a site-led approach will ensure maximum benefit from limited resources available for management of widespread weeds. Therefore, specific information on management sites was compiled to assist in strategic decisions relating to investment aimed at protecting biological assets from widespread weeds. This information will enable all stakeholders in the CWCMA region to target on-ground works to those locations where weed control will have the greatest benefits for biodiversity. In addition, implementation of monitoring using the *Monitoring manual for bitou bush control and native plant recovery* (Hughes *et al.* 2009) will allow CWCMA to measure progress towards relevant targets, including the Natural Resource Commission (NRC) target for invasive species (NRC 2005) and Catchment Action Plan (CAP) targets.

B2. REGIONAL CONTEXT

This section summarises the strategies, policies and programs relevant to weed management in CWCMA region and outlines how they relate to the development and outputs of this project. Relevant state-wide strategies, targets and legislation are addressed in the *statewide framework*.

B2.1 Catchment Action Plan

Under the NSW *Catchment Management Authorities Act 2003*, each CMA is required to prepare a CAP that outlines future priorities for the specific CMA and provides a coordinated plan for natural resource work in the region over a 10-year period. The CWCMA CAP outlines resource condition targets under seven themes: (i) salinity, (ii) water, (iii) vegetation, (iv) biodiversity, (v) soil, (vi) people and community and (vii) cultural heritage. A series of management targets for each resource condition target illustrate how the CMA will invest in and measure progress towards natural resource management (CWCMA 2007).

This widespread weed project will primarily contribute to the Vegetation Condition and Biodiversity Condition targets:

- » CTV1 – By 2016, 1,200,000 ha (13%) of the Catchment area is managed primarily to maintain or achieve optimal native vegetation condition, and all vegetation types are represented in the Catchment.
- » CTB1 – By 2016, 60,000 ha (5%) of the catchment is managed primarily for biodiversity outcomes (aquatic and terrestrial) including ecosystem diversity.

Within these catchment targets, the management of widespread weeds for biodiversity conservation will also address the following management targets:

- » MTV6 – By 2016, reduce area in the catchment affected by environmental weeds by 50,000 ha.
- » MTV3 – By 2016, restore and enhance the area of high conservation value vegetation by 10,000 ha.
- » MTV4 – By 2016, enhance native riparian vegetation identified as being slightly degraded along 200 km of streams, and improve highly degraded native riparian vegetation along 100 km of streams.
- » MTV7 – By 2016, all public lands (which primarily contain native vegetation) be managed according to integrated management plans that optimise nature conservation and, where appropriate, production.
- » MTB1 – By 2016, 10,000 ha of high conservation value habitat types to be managed to maintain or improve their biodiversity value.
- » MTB2 – By 2016, undertake 10 projects identified from Priorities Action Statements and/or species recovery plans to maintain viable priority species, populations or communities.
- » MTB3 – By 2016, maintain or enhance instream habitat features along all streams, and improve 100 km of highly degraded native riparian/instream habitat along streams.

Undertaking weed management for biodiversity conservation may also have other flow on effects for the *Water condition* target:

- » CTW1 – By 2016, improve surface and groundwater system health across the catchments.

And more specifically the following management target for wetlands:

- » MTW4 – By 2016, maintain and improve the health of internationally recognised, nationally listed and other wetlands within the catchment.

B2.2 Central West Catchment Environmental Weeds Strategy

The Central West Catchment Environmental Weeds Strategy (Sullivan and Harty 2008) lists established, newly recorded and emerging environmental weeds in the CWCMA region. It also draws on work from this project showing the EECs impacted by specific weed species.

The strategy recommends (i) community engagement, (ii) development of a prioritised list of weeds, and the (iii) identification areas of high conservation value which are currently threatened by environmental weeds. This project establishes a process to deliver and provides interim results for these activities.

B2.3 Regional weed advisory committees and management plans

Regional weed advisory committees support the communication of best practice amongst neighbouring councils or local control authorities, who are responsible for implementing the NSW *Noxious Weed Act 1993* (NW Act). Membership includes NSW Department of Primary Industries (NSW DPI), regional councils and public land managers (e.g. National Parks and Wildlife Service (NPWS)).

Regional weed management plans are developed by regional weeds advisory committees and target specific weed species for control within a defined area of operation. They outline the biology of the weed and its impacts as well as overall objectives and actions required to coordinate an effective control program. The Macquarie Valley Weeds Advisory Committee is responsible for coordinating a number of regional management plans in most of the CWCMA region. Current plans include: Chilean needle grass (*Nassella neesiana*), Coolatai grass (*Hyparrhenia hirta*), serrated tussock (*Nassella trichotoma*), African boxthorn (*Lycium ferocissimum*), athel pine (*Tamarix aphylla*), blackberry (*Rubus fruticosus* agg.), blue heliotrope (*Heliotropium amplexicaule*), golden dodder (*Cuscuta campestris*), green cestrum (*Cestrum parqui*), Johnson and Columbus grasses (*Sorghum halepense* and *Sorghum x almun*), mimosa bush (*Vachellia farnesiana*), parthenium weed (*Parthenium hysterophorus*), prickly pear and harrisia cactus (*Cylindropuntia* spp., *Opuntia* spp. except *O. ficus-indica* and *Harrisia* spp.), Scotch thistle (*Onopordum* spp.), Scotch/English broom (*Cytisus scoparius*), silver-leaf nightshade (*Solanum elaeagnifolium*), and St John's wort (*Hypericum perforatum*).

B2.4 Office of Environment & Heritage (OEH) Regional Pest Management Strategies

Within the CWCMA region, the NPWS (part of OEH) administers significant land for conservation purposes. Weed management priorities on NPWS estate are currently established within 18 regional pest management strategies (RPMS) based on NPWS regions. In 2010, the number of regions was reduced to 14. However, revision of the strategies is not due until 2011.

As the NPWS regional boundaries do not align with those of the CMA regions, there are two strategies relevant to the CWCMA region: (i) Central West, and (ii) Upper Darling–Dubbo Area (see www.environment.nsw.gov.au/pestsweeds/RegionPestManagement.htm). During 2009–10, NPWS undertook a comprehensive survey of NPWS estate to establish biodiversity priorities for widespread weeds. Relevant priorities from these strategies and surveys are incorporated into this project (see Section 1.6.1 of the *statewide framework*).

B2.5 Priorities Action Statement

In accordance with the TSC Act, the Priorities Action Statement (PAS) was developed to ensure that conservation actions were established for all biodiversity listed under the Act. The PAS outlines the broad strategies and detailed priority actions to be undertaken in New South Wales to promote the recovery of threatened species, populations and ecological communities and manage key threatening processes (KTPs).

There are 18 actions relevant to weed management in the CWCMA region (Appendix B1). Of these, 14 are generic, recommending targeted bush regeneration or general weed management, while only four of the actions direct weed control programs to specific weeds and/or sites.

This project incorporates information from the PAS to identify priority weeds posing a threat to threatened species and ecological communities, as well as priority sites for weed control.

B3. REGIONAL OUTPUTS

B3.1 Methodology used to develop the priorities

The *statewide framework* outlines the broad methods applied across the 13 CMA regions in New South Wales to establish widespread weed priorities for biodiversity conservation. The primary output is a ranked list of weed management sites for each CMA region in New South Wales. Rankings are based on where investment in weed control will result in greatest reduction of the impact of widespread weed species on biodiversity; primarily, but not exclusively, on threatened biological assets (plant and animal species, populations and ecological communities listed under the TSC Act and the national *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).

This approach uses four stages to establish regional weed management priorities for biodiversity conservation:

1. Identify and prioritise the widespread weed species posing a threat to biodiversity in each region.
2. Identify the biodiversity at risk from high priority weed species identified in Stage 1.
3. Identify sites where control will maximise biodiversity outcomes by reducing widespread weed impacts.
4. Develop and implement a monitoring system to determine whether investment in weed control programs at high priority sites has resulted in a biodiversity response and thus progress towards the relevant statewide targets.

The specific details of implementing the process in the CWCMA region (Stages 1 to 3) are outlined below with modifications to account for existing data and strategies. Stage 4 is discussed in the overarching *statewide framework*.

B3.1.1 Workshops in the CWCMA region

Two workshops were held in the CWCMA region at Orange and Dubbo on 1 and 3 April 2008 respectively. Natural resource managers from relevant local councils, government departments, universities and community organisations were invited to attend. Representatives from CWCMA, OEH, NSW DPI (including Forests NSW), Land and Property Management Authority, local councils, Livestock Health and Pest Authorities, field naturalist groups, graziers and other primary producers and private consultants attended the workshops. See Appendix B2 for a full list of attendees.

B3.1.2 CWCMA specific webpages

On the main project website (www.environment.nsw.gov.au/cmaweeds), specific CMA webpages were established to provide stakeholders with information on the process followed in the CWCMA region including: workshop details, outcomes from workshops, the site nomination form and instructions, and a project contact (www.environment.nsw.gov.au/cmaweeds/CentralWest.htm).

B3.2 The process

B3.2.1 Stage 1. Identifying weeds that pose a threat in the CWCMA region

A weeds dataset for the CWCMA region

A list of weeds to consider at the workshops was collated using the resources outlined in Section 3.1.3 of the *statewide framework* and the sources listed in Section B2.

Distribution of weeds within the CWCMA region

The weeds dataset for the CWCMA region was presented to workshop participants who were asked to identify which weeds they considered to be widespread. The weeds list considered at each workshop within the region is provided in Appendix B3.

Current impact of widespread weeds on biodiversity

Workshop participants were asked to prioritise the current impact of each widespread weed as Low, Medium or High (Table B1). A total of 47 weeds were identified as having a high impact on biodiversity and constituted a draft list of priority weeds which was distributed to workshop participants and other stakeholders for comment. Stakeholder comments were incorporated in the list, which is presented in Table B2.

Table B1. Definitions of the level of impact of weed species on biodiversity as used in stakeholder evaluations.

Impact	Definition
High	High impact weeds are capable of causing major change to the composition or structure of a community (transformers). They can suppress the regeneration of many species in a community and have a major effect on dominant species in a community. They are long-lived or can form self-sustaining monocultures.
Medium	Medium impact weed species can have a modest effect on the composition or structure of a community. They can suppress the regeneration of some species and have some effect on dominant species in a community. They are relatively long-lived or can persist over long periods of time.
Low	Low impact weeds do not affect structurally dominant species. They do not suppress the regeneration of native species. They do not persist or have relatively short life spans.

Table B2. Priority widespread weeds impacting on biodiversity in the CWCMA region (listed in alphabetical order).

<i>Scientific name</i> (Common name)	KTP ¹	WoNS ²	Noxious	
			NSW ³	LGA ⁴
<i>Achillea millefolium</i> (milfoil)				
<i>Ailanthus altissima</i> (tree of heaven)	Y*			Y
<i>Alternanthera pungens</i> (khaki weed)				
<i>Asparagus asparagoides</i> (bridal creeper)	Y	Y	5	
<i>Bidens pilosa</i> (cobblers pegs, farmer's friend)				
<i>Bidens subalternans</i> (large cobblers pegs, farmer's friend)				
<i>Bromus diandrus</i> (ripgut brome)				
<i>Carthamus lanatus</i> (saffron thistle)				
<i>Cenchrus incertus</i> and <i>C. longispinus</i> (spiny burr grass)				Y
<i>Centaurea calcitrapa</i> (star thistle)				Y
<i>Centaurea solstitialis</i> (St Barnaby's thistle)				
<i>Cestrum parqui</i> (green cestrum)	Y*			Y

Scientific name (Common name)	KTP ¹	WoNS ²	Noxious	
			NSW ³	LGA ⁴
<i>Cirsium vulgare</i> (spear thistle)	Y*			
<i>Conium maculatum</i> (hemlock)				Y
<i>Crataegus monogyna</i> (hawthorn)	Y*			
<i>Cyperus eragrostis</i> (umbrella sedge)				
<i>Cytisus scoparius</i> (Scotch broom, English broom)	Y			Y
<i>Genista monspessulana</i> (Montpellier broom, cape broom)	Y*			
<i>Gleditsia triacanthos</i> (honey locust)	Y*			
<i>Heliotropium amplexicaule</i> (blue heliotrope)	Y*			Y
<i>Hyparrhenia hirta</i> (Coolatai grass)	Y			Y
<i>Hypericum perforatum</i> (St John's wort)	Y*			Y
<i>Hypochaeris radicata</i> (flatweed, cats ear)				
<i>Ligustrum lucidum</i> (large-leaf privet)	Y*			Y
<i>Ligustrum sinense</i> (small-leaf privet)	Y*			Y
<i>Lycium ferocissimum</i> (African boxthorn)	Y*			Y
<i>Melia azedarach</i> (white cedar)				
<i>Nassella trichotoma</i> (serrated tussock)	Y	Y		Y
<i>Opuntia aurantiaca</i> (tiger pear)	Y*		4	
<i>Opuntia stricta</i> (common (prickly) pear)	Y*		4	
<i>Phalaris aquatica</i> (phalaris)	Y			
<i>Phyla canescens</i> (lippia)	Y*		4	
<i>Pinus radiata</i> (radiata pine)	Y*			
<i>Robinia pseudoacacia</i> (black locust)	Y*			
<i>Rorippa nasturtium-aquaticum</i> (watercress)				
<i>Rubus fruticosus</i> agg. (blackberry)	Y*	Y	4	
<i>Rumex</i> spp. (docks)				
<i>Salix</i> spp. (willows)	Y*	Y	5	
<i>Schinus areira</i> (pepper tree)	Y*			
<i>Senna barclayana</i> (pepper leaf senna)				
<i>Silybum marianum</i> (variegated thistle)	Y*			
<i>Solanum cinereum</i> (Narrawa burr)				
<i>Solanum elaeagnifolium</i> (silver-leaf nightshade)				Y
<i>Sorghum halepense</i> (Johnson grass)				Y
<i>Urtica urens</i> (stinging nettle)				
<i>Xanthium occidentale</i> and <i>X. italicum</i> (Noogoora burr)				Y
<i>Xanthium spinosum</i> (Bathurst burr)				Y

KTP¹ = Weed listed under a Key Threatening Process in the TSC Act; WoNS² = Weeds of National Significance (Thorp and Lynch 2000); NSW³ = All of New South Wales; LGA⁴ = Local Government Areas. Y = yes, where the species is listed under a KTP, as a WoNS or is listed as noxious in at least one LGA within the region.* = Proposed only (Preliminary Determination under the TSC Act). All listings are as at 31 August 2010.

Numbers in the table refer to the control class under the NSW *Noxious Weeds Act 1993*.

B3.2.2 Stage 2. Identifying biodiversity at risk from high priority weeds

At each workshop, participants were provided with lists of endangered ecological communities (EECs) and threatened fauna and flora (as listed under the TSC Act and EPBC Act), as well as general vegetation types present in the CWCMA region. They were asked to consider if communities or species on these lists were currently at risk from each of the high priority widespread weeds (identified during Stage 1) and a draft list of biodiversity at risk was created. Following the workshops, this list was sent to workshop participants and other stakeholders for comment and verification.

The revised list identifies EECs and vegetation communities that are considered under threat from the high priority weeds (Tables B3 and B4). This information was used to help guide site nominations (see Stage 3 below). Impacts of weeds on individual threatened species were not identified due to a lack of confidence among workshop participants to comment on interactions between species.

The list of EECs and vegetation communities is by no means exhaustive, but is likely to represent communities where the priority weeds are having the greatest immediate impact. The lists can be used to identify knowledge gaps or areas that require further information and can also be updated as new information becomes available through site nominations or further community consultation.

Impact of widespread weeds on EECs and vegetation communities

The EEC impacted by the greatest number of high priority weeds was White Box–Yellow Box–Blakley’s Red Gum Grassy Woodland (Table B3). Twenty of the high impact weeds were considered to be adversely affecting this endangered community. Three weed species were noted as impacting on four or more EECs. These were St John’s wort (*Hypericum perforatum*), Coolatai grass (*Hyparrhenia hirta*) and prickly pear (*Opuntia stricta*).

The general vegetation communities most affected by the high priority weeds were riparian areas and tablelands woodland (Table B4). Five priority weeds commonly impacted seven vegetation communities each. These were St John’s wort (*Hypericum perforatum*), flatweed (*Hypochaeris radicata*), serrated tussock (*Nassella trichotoma*), tiger pear (*Opuntia aurantiaca*) and blackberry (*Rubus fruticosus* agg.)

B3.2.3 Stage 3. Selecting and prioritising sites for control

Site nomination process

Stakeholders were asked to nominate sites where high priority weeds were impacting biodiversity using a site nomination process. Site nomination forms and instructions (see Appendix 3 of *statewide framework*) were emailed to key stakeholders (including workshop participants), and placed on the CWCMA project website to enable access for others. In order to capture high priority biodiversity sites on private lands, site nomination forms were also sent to all landholders with voluntary conservation agreements (VCA) and wildlife refuges with the NPWS in the CWCMA region, along with a letter outlining the aims of the project (Appendix B4) and a list of priority weeds in the region as identified in Stage 1. In addition, during 2009–10 NPWS undertook a comprehensive survey of sites on NPWS estate.

Control categories

The 60 sites nominated to date (as at 31 August 2010) for the CWCMA region were separated into six categories using the site ranking process outlined in Appendix 4 of the *statewide framework*. The ranking of sites provides strategic direction for on-ground works by identifying areas where weed control programs will have positive benefits for biodiversity.

This process resulted in 12 sites in control category 1 (Table B5). Category 1 represents the highest priority for action. Within category 1, sites were ordered based on the number of biological entities (e.g. threatened species, populations or ecological communities) present at the site to allow prioritisation within categories. Nominated sites were deemed invalid for ranking if three or more of the required fields contained insufficient information.

B3.2.4 Review and additional site nominations

A draft of this report was provided to CWCMA for comment and review on 20 July 2009. The draft report contained information on Stages 1 and 2, as well as the list of site nominations received before 31 December 2008. Summary information from site nominations was provided in the draft report to highlight any important assets or tenures that may have been missed in the initial site nomination process. In addition, site nominations received for NPWS estate were provided to the NPWS regions for comment and review.

Further site nominations were then sought and any nominations received from 2009 to August 2010 were included and then ranked. However, the site nomination process is ongoing and should be used by CWCMA to identify additional regional priorities for weed control that are not already captured in this report. The complete list of priority sites for control will therefore be only held electronically and updated by the CMA.

Table B3. Endangered ecological communities under threat from priority widespread weeds in the CWCMA region as determined by Stages 1 and 2.

Priority widespread weed <i>Scientific name</i> (Common name)	Endangered Ecological Community						
	Brigalow Community	Coolibah Black Box Woodland	Fuzzy Box on Alluvials	Mt Canobolas Xanthoparmelia Lichen Community	Myall Woodland	White Box-Yellow Box-Blakley's Red Gum Grassy Woodland	Inland Grey Box Woodland
<i>Achillea millefolium</i> (milfoil)							
<i>Ailanthus altissima</i> (tree of heaven)							
<i>Alternanthera pungens</i> (khaki weed)							
<i>Asparagus asparagoides</i> (bridal creeper)							
<i>Bidens pilosa</i> (cobblers pegs, farmer's friend)							
<i>Bidens subalternans</i> (large cobblers pegs, farmer's friend)							
<i>Bromus diandrus</i> (ripgut brome)							
<i>Carthamus lanatus</i> (saffron thistle)							
<i>Cenchrus incertus</i> and <i>C. longispinus</i> (spiny burr grass)							
<i>Centaurea calcitrapa</i> (star thistle)							
<i>Centaurea solstitialis</i> (St Barnaby's thistle)							
<i>Cestrum parqui</i> (green cestrum)							
<i>Cirsium vulgare</i> (spear thistle)							
<i>Conium maculatum</i> (hemlock)							
<i>Crataegus monogyna</i> (hawthorn)							
<i>Cyperus eragrostis</i> (umbrella sedge)							

Priority widespread weed	Endangered Ecological Community						
Scientific name (Common name)	Brigalow Community	Coolibah Black Box Woodland	Fuzzy Box on Alluvials	Mt Canobolas Xanthoparmelia Lichen Community	Myall Woodland	White Box-Yellow Box-Blakley's Red Gum Grassy Woodland	Inland Grey Box Woodland
<i>Cytisus scoparius</i> (Scotch broom, English broom)							
<i>Genista monspessulana</i> (Montpellier broom, cape broom)							
<i>Gleditsia triacanthos</i> (honey locust)							
<i>Heliotropium amplexicaule</i> (blue heliotrope)							
<i>Hyparrhenia hirta</i> (Coolatai grass)							
<i>Hypericum perforatum</i> (St John's wort)							
<i>Hypochaeris radicata</i> (flatweed, cats ear)							
<i>Ligustrum lucidum</i> (large-leaf privet)							
<i>Ligustrum sinense</i> (small-leaf privet)							
<i>Lycium ferocissimum</i> (African boxthorn)							
<i>Melia azedarach</i> (white cedar)							
<i>Nassella trichotoma</i> (serrated tussock)							
<i>Opuntia aurantiaca</i> (tiger pear)							
<i>Opuntia stricta</i> (common (prickly) pear)							
<i>Phalaris aquatica</i> (phalaris)							
<i>Phyla canescens</i> (lippia)							
<i>Pinus radiata</i> (radiata pine)							
<i>Robinia pseudoacacia</i> (black locust)							
<i>Rorippa nasturtium-aquaticum</i> (watercress)							
<i>Rubus fruticosus</i> agg. (blackberry)							
<i>Rumex</i> spp. (docks)							
<i>Salix</i> spp. (willows)							
<i>Schinus areira</i> (pepper tree)							
<i>Senna barclayana</i> (pepper leaf senna)							
<i>Silybum marianum</i> (variegated thistle)							
<i>Solanum cinereum</i> (Narrawa burr)							
<i>Solanum elaeagnifolium</i> (silver-leaf nightshade)							
<i>Sorghum halepense</i> (Johnson grass)							
<i>Urtica urens</i> (stinging nettle)							
<i>Xanthium occidentale</i> and <i>X. italicum</i> (Noogoora burr)							
<i>Xanthium spinosum</i> (Bathurst burr)							

Table B4. Vegetation communities under threat from priority widespread weeds in the CWCMA region as determined by Stages 1 and 2.

Priority widespread weed Scientific name (Common name)	Vegetation community												
	Tablelands Forest	Tablelands Woodland	Tablelands Grassland	Slopes Forest	Slopes Woodland	Slopes Grassland	Plains Woodland	Plains Grassland	Plains Shrubland	Poplar Box Woodland	Riparian	Watercourses	Wetland
<i>Achillea millefolium</i> (milfoil)													
<i>Ailanthus altissima</i> (tree of heaven)													
<i>Alternanthera pungens</i> (khaki weed)													
<i>Asparagus asparagoides</i> (bridal creeper)													
<i>Bidens pilosa</i> (cobblers pegs, farmer's friend)													
<i>Bidens subalternans</i> (large cobblers pegs)													
<i>Bromus diandrus</i> (ripgut brome)													
<i>Carthamus lanatus</i> (saffron thistle)													
<i>Cenchrus incertus</i> and <i>C. longispinus</i> (spiny burr grass)													
<i>Centaurea calcitrapa</i> (star thistle)													
<i>Centaurea solstitialis</i> (St Barnaby's thistle)													
<i>Cestrum parqui</i> (green cestrum)													
<i>Cirsium vulgare</i> (spear thistle)													
<i>Conium maculatum</i> (hemlock)													
<i>Crataegus monogyna</i> (hawthorn)													
<i>Cyperus eragrostis</i> (umbrella sedge)													
<i>Cytisus scoparius</i> (Scotch/English broom)													
<i>Genista monspessulana</i> (Montpellier/cape broom)													
<i>Gleditsia triacanthos</i> (honey locust)													
<i>Heliotropium amplexicaule</i> (blue heliotrope)													
<i>Hyparrhenia hirta</i> (Coolatai grass)													
<i>Hypericum perforatum</i> (St John's wort)													
<i>Hypochaeris radicata</i> (flatweed, cats ear)													
<i>Ligustrum lucidum</i> (large-leaf privet)													
<i>Ligustrum sinense</i> (small-leaf privet)													
<i>Lycium ferocissimum</i> (African boxthorn)													
<i>Melia azedarach</i> (white cedar)													
<i>Nassella trichotoma</i> (serrated tussock)													
<i>Opuntia aurantiaca</i> (tiger pear)													
<i>Opuntia stricta</i> (common (prickly) pear)													
<i>Phalaris aquatica</i> (phalaris)													
<i>Phyla canescens</i> (lippia)													

Priority widespread weed	Vegetation community												
Scientific name (Common name)	Tablelands Forest	Tablelands Woodland	Tablelands Grassland	Slopes Forest	Slopes Woodland	Slopes Grassland	Plains Woodland	Plains Grassland	Plains Shrubland	Poplar Box Woodland	Riparian	Watercourses	Wetland
<i>Pinus radiata</i> (radiata pine)													
<i>Robinia pseudoacacia</i> (black locust)													
<i>Rorippa nasturtium-aquaticum</i> (watercress)													
<i>Rubus fruticosus</i> agg. (blackberry)													
<i>Rumex</i> spp. (docks)													
<i>Salix</i> spp. (willows)													
<i>Schinus areira</i> (pepper tree)													
<i>Senna barclayana</i> (pepper leaf senna)													
<i>Silybum marianum</i> (variegated thistle)													
<i>Solanum cinereum</i> (Narrawa burr)													
<i>Solanum elaeagnifolium</i> (silver-leaf nightshade)													
<i>Sorghum halepense</i> (Johnson grass)													
<i>Urtica urens</i> (stinging nettle)													
<i>Xanthium occidentale</i> and <i>X. italicum</i> (Noogoora burr)													
<i>Xanthium spinosum</i> (Bathurst burr)													

Table B5. The number of sites in each of the six control categories in the CWCMA region as at 31 August 2010.

	Categories						Not valid [^]	Total
	1*	2	3	4	5	6		
Number of sites	12	2	6	7	2	3	28	60

*Category 1 represents the highest priority for action - see Appendix 4 of the *statewide framework* for further information.

[^] insufficient information was provided to reliably allocate these sites to a category.

B4. SUMMARY FOR CENTRAL WEST CMA

The approach followed here to identify priorities for widespread weed management for biodiversity conservation has been endorsed by the NSW Natural Resources and Environment CEO Cluster Group. This site-led approach is across all land tenures. Thus, where possible, government agencies and public land managers should use the priorities to help guide investment in widespread weed management.

Priority is directed to areas where the outcomes of weed control will have the greatest biodiversity benefit (in terms of the biological assets at risk) and thus enable the delivery of a number of key objectives in New South Wales. Greatest benefit will be achieved when the outputs of this project are embraced by multiple natural resource managers at a landscape scale. Whilst the regional priorities were developed specifically to guide future investment by CMAs, ideally the site ranking will be adopted by all environmental managers to strategically direct resources to manage widespread weeds across all land tenures. Control programs should be undertaken in a coordinated manner by CMAs as well as by state and local authorities with jurisdiction in the region.

Control programs at priority sites will need to be complementary to existing control programs that have primary objectives other than reduction of current weed impacts, e.g. noxious weed control, erosion management or strategic prevention programs to avoid future impacts.

B4.1 Meeting the NRC target for invasive species

Undertaking weed control programs at the high priority sites identified here will help to deliver on the third indicator of the NRC target for invasive species, '*success of control programs for widespread invasive species*'.

The list of priority sites, weed species and biodiversity outlined here for the CWCMA region can also be used to meet a range of CMA priorities. This project directly addresses the CWCMA CAP targets as outlined in Section B2.1, as it supports management of widespread weeds for biodiversity conservation. Following an implementation option outlined in Section 4 of the *statewide framework* will result in a number of specific outcomes for CWCMA. However, how the list of sites is used to guide investment will depend on the number of sites in each control category, the funding available, previous commitment to high priority sites and the specifics of individual CMA CAP actions (both for weeds and biodiversity conservation).

B4.2 Biodiversity conservation and widespread weed management

The list of priority sites provides strategic direction for on-ground works by identifying areas where weed control will have positive benefits for biodiversity. Identifying the specific native species and ecological communities at risk from weeds at the site will ensure that control and monitoring programs are tailored towards their recovery, helping to ensure conservation outcomes.

Identification of the native species and ecological communities negatively impacted by high priority weeds, and site specific information on their location and condition in the CWCMA region, will improve tools like regional pest strategies, the PAS database and recovery plans for threatened species under the TSC Act. Currently many of the weed control actions for threatened species and ecological communities are quite general. Information obtained via this project will improve the usefulness of weed control actions in the PAS by providing detail on the weed species having an impact and sites where control is required. It also highlights weed impacts and site locations for EECs, threatened plant species and threatened fauna species not currently captured in the PAS.

Detailed monitoring that specifically assesses the potential reduction in impact of widespread weeds in the CWCMA is also required. Monitoring programs need to measure (i) reductions in weed presence, and (ii) response of native species and communities, following control (see Section 3.1.6 of the *statewide framework*).

B4.3 Capability for interrogation and review

The priorities identified in this report are not static. They do not represent a comprehensive ground-based assessment of the entire CWCMA region. As conditions or management requirements change at existing sites, and as information on new sites becomes available, they can be included in the CWCMA site spreadsheet for subsequent re-ranking in the future (either formally or informally). Also, by combining the sites with other spatial data for biodiversity conservation, greater integration between weed management and biodiversity conservation can be achieved.

The draft report for CWCMA contained site nominations received before 31 December 2008. Any site nominations received from 2009 to 31 August 2010 were included and ranked in this final report. Any additional site nominations or changes to existing nominations should be provided to the relevant contact within CWCMA for inclusion in the site spreadsheet and sites should subsequently be re-ranked by CWCMA.

The list of priority sites will be kept by the CMA in electronic form to ensure that the lists are updated or revised when necessary. This is important given the continuing nature of the site nomination process, data collection and monitoring.

B5. REFERENCES

Coutts-Smith, AJ and Downey, PO 2006. *Impact of weeds on threatened biodiversity in NSW*. Technical Series 11. CRC for Australian Weed Management, Adelaide.

CWCMA 2007. *Central West Catchment Action Plan*. Central West Catchment Management Authority, Wellington.

CWCMA 2008. Central West Catchment Management Authority homepage. Central West Catchment Management Authority, Orange, www.cw.cma.nsw.gov.au, accessed June 2009.

DECC 2009. Threatened Species – Species, Populations and Ecological Communities of NSW. Department of Environment and Climate Change, www.threatenedspecies.environment.nsw.gov.au/tsprofile/index.aspx, accessed June 2009.

Hughes, NK, Burley, AL, King, SA and Downey, PO 2009. *Monitoring manual for bitou bush control and native plant recovery*. Department of Environment, Climate Change and Water, Sydney, NSW, www.environment.nsw.gov.au/bitouTAP/monitoring.htm.

NRC 2005. *State-wide targets for natural resource management*. Natural Resources Commission, Sydney, www.nrc.nsw.gov.au/content/documents/Standard%20and%20targets%20-%20The%20Standard%20and%20targets.pdf.

Sullivan, M and Harty, J-A 2008. *Central West Catchment Environmental Weeds Strategy*. Sinclair Knight Merz, Newcastle.

Thorp, JR and Lynch, R 2000. *The Determination of Weeds of National Significance*. National Weeds Strategy Executive Committee, Launceston.

B6. APPENDICES

Appendix B1: Current actions in the Priorities Action Statement relating to weed management in the CWCMA region

Appendix B2: Attendees at CWCMA weed impacts to biodiversity workshops

Appendix B3: All weeds considered at the workshops in the CWCMA region, their distribution and their relative impact on biodiversity

Appendix B4: Template of letter sent to private landholders with voluntary conservation agreements or wildlife refuges on their properties

**APPENDIX B1.
CURRENT ACTIONS IN THE PRIORITIES ACTION STATEMENT RELATING
TO WEED MANAGEMENT IN THE CWCMA REGION**

Threatened species, populations and communities	Type of species	Level of threat	Priority actions in PAS relating to weed management
High priority			
<i>Anseranas semipalmata</i>	Birds	V	Promote and support weed control programs within wetlands.
<i>Asperula asthenes</i>	Herbs and Forbs	V	Control weeds as they are a serious threat to <i>Asperula asthenes</i> in many locations but control by chemical means may not be suitable; priority should be given to sites with reasonable native vegetation.
<i>Eucalyptus canobolensis</i>	Trees	V	Conduct weed control (primarily blackberry and pinus).
<i>Paralucia spinifera</i>	Invertebrates	E	Undertake weed control on relevant lands in accordance with guidelines. SFNSW will undertake weed control in areas of large infestation of <i>Cytisus scoparius</i> adjacent to site 9.
<i>Prostanthera stricta</i>	Shrubs	V	Undertake priority weed control especially at Stockyard Point Mt Vincent; Genowlan Mt; Eagle View Mt Vincent; SE Mt Ida.
<i>Pultenaea glabra</i>	Shrubs	V	Undertake appropriate weed control activities where necessary.
<i>Zieria obcordata</i>	Shrubs	E	Investigate the removal of tree of heaven at Wellington population and determine whether follow up removal is required (included in benchmarking survey).
Medium priority			
Artesian Springs Ecological Community	Threatened Ecological Communities	E	1. Prohibit the establishment of exotic pasture species in GAB discharge spring wetlands. 2. Provide advice and support for the removal of exotic plants around any newly located spring wetlands; where required.
<i>Austrostipa wakoolica</i>	Herbs and Forbs	E	Conduct weed control at 5 selected sites and monitor benefit.
Brigalow within the Brigalow Belt South; Nandewar and Darling Riverine Plains Bioregions	Threatened Ecological Communities	E	Encourage land managers to employ best management practice standards in controlling noxious weed or pest species in EECs.
Coolibah-Black Box Woodland of the Northern Riverine Plains in the Darling Riverine Plains and Brigalow Belt South Bioregions	Threatened Ecological Communities	E	Encourage land managers to employ best management practice standards in controlling noxious weed or pest species without damaging the EEC.
<i>Dichanthium setosum</i>	Herbs and Forbs	V	Conduct weed control; especially of invasive exotic grasses.
<i>Digitaria porrecta</i>	Herbs and Forbs	E	Conduct weed control; especially of invasive exotic grasses.
Fuzzy Box on alluvials of South West Slopes; Darling Riverine Plains and the Brigalow Belt South	Threatened Ecological Communities	E	Encourage land managers to employ best management practice standards in controlling noxious weed or pest species in EECs.
<i>Prostanthera cryptandroides</i> subsp. <i>cryptandroides</i>	Shrubs	V	Undertake priority weed control actions at sites where weed invasion has been identified as an issue.
Low priority			
<i>Miniopterus schreibersii oceanensis</i>	Bats	V	Undertake non-chemical removal of weeds (e.g. lantana; blackberry) to prevent obstruction of cave entrances.

<i>Syconycteris australis</i>	Bats	V	Control coastal weed species eg bitou bush; but avoid aerial spraying during the flowering season of important heath species as herbicides can directly collect in flowers that are fed upon at night.
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Note: Although the species in this table are found in the CWCMA region some actions listed above are not specific to CWCMA.

V = listed as vulnerable under the TSC Act; E = listed as endangered under the TSC Act.

**APPENDIX B2.
ATTENDEES AT CWCMA WEED IMPACTS TO BIODIVERSITY
WORKSHOPS**

Name	Organisation	Position
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Tuesday 1 April 2008 at Orange

Koshy Varghese	Central West CMA	Catchment Officer
Mick McLennan	Land & Property Management Authority	Conservation Field Officer
Jason Neville	DECCW (now OEH, formerly Department of Environment, Climate Change & Water)	Senior Ranger- Pest Management
John Dalton	Livestock Health & Pest Authorities	State Landcare Coordinator
Carl Thorn	Cabonne Council	Weeds Inspector
Mitchell Clapham	Private Landholder	
Alan Heath	Private Landholder	
Wendy Bushell	Midwestern Regional Council	Weeds Inspector
Megan Power	Regional Project Officer	Macquarie Valley Weeds Advisory Committee
Stephen Johnson	I&I NSW	Weed Ecologist
Scott Sullivan	LHPA	Ranger
Jane Paul	Orange Urban Landscape Group	
Meg Hoskin	Orange Field Naturalists	
Col Bower	FloraSearch	Consultant Botanist
Sean Brindle	I&I NSW	Project Officer

Thursday 3 April 2008 at Dubbo

Rob Williamson	I&I NSW	Team Leader- Invasive Species
John Nolan	Land & Property Management Authority	Environmental Officer
Mick Redfern	Land & Property Management Authority	Senior Environmental Officer
Harold Grant	Dubbo Field Naturalist & Conservation Society	
Elizabeth Betts	Private Landholder	
Lynton Auld	Dubbo City Council	Manager Landcare Services
Andrew Deane	DECCW	Regional Operations Coordinator
Craig Bennett	Wellington Council	Weeds Officer
Andrew Cosier	Wellington Council	District Weeds Officer
Rob Armstrong	DECCW	Senior Threatened Species Officer
Peter Thompson	CWCMA	Biodiversity Officer
Peter Gray	I&I NSW	Regional Weeds Coordinator

DECCW is now known as Office of Environment & Heritage (OEH), I&I NSW is now known as NSW Department of Primary Industries (NSW DPI)

APPENDIX B3.

ALL WEEDS CONSIDERED AT THE WORKSHOPS IN THE CWCMA REGION, THEIR DISTRIBUTION AND THEIR RELATIVE IMPACT ON BIODIVERSITY

Table B6. Primary list of weeds considered at workshops in the CWCMA region.

Primary list of weeds considered at workshops	Orange		Dubbo	
	D ¹	I ²	D ¹	I ²
<i>Acetosella vulgaris</i> (sheep sorrel)	W	L		
<i>Achillea millefolium</i> (milfoil)	W	H	nc	
<i>Agrostis capillaris</i> (browntop bent grass)				
<i>Ailanthus altissima</i> (tree of heaven)	W	H	W	H
<i>Aira caryophylla</i> (silvery hairgrass)			nc	
<i>Alternanthera pungens</i> (khaki weed)	W	H	W	L
<i>Amaranthus powellii</i> (Powell's amaranth)	nc			
<i>Amaranthus retroflexus</i> (redroot amaranth)				
<i>Ammi majus</i> (bishop's weed)				
<i>Amsinckia</i> spp. (yellow burr weeds)				
<i>Anagallis arvensis</i> (scarlet pimpernel)	W	M		
<i>Andropogon virginicus</i> (whiskey grass)				
<i>Anthemis cotula</i> (stinking mayweed)				
<i>Anthoxanthum odoratum</i> (sweet vernal grass)	W	L	nc	
<i>Arctotheca calendula</i> (Capeweed)			nc	
<i>Argemone ochroleuca</i> (Mexican poppy)				
<i>Artemisia verlotiorum</i> (mugwort)				
<i>Asphodelus fistulosus</i> (onion weed)				
<i>Astragalus hamosus</i> (yellow milk vetch)				
<i>Avena fatua</i> (wild oats)	W	L		
<i>Bidens pilosa</i> (cobblers pegs)	W	H	W	M
<i>Bidens subalternans</i> (large cobblers pegs)	W	H		
<i>Brassica juncea</i> (Indian mustard)				
<i>Brassica rapa</i> (wild turnip)				
<i>Brassica tournefortii</i> (wild turnip)				
<i>Briza maxima</i> (blowfly grass)			nc	
<i>Briza minor</i> (shivery grass)				
<i>Bromus brevis</i> (prairie grass)	W	L		
<i>Bromus catharticus</i> (prairie grass)	W	L		
<i>Bromus diandrus</i> (ripgut brome)				
<i>Bromus mollis</i> (soft brome)	W	M	nc	
<i>Bryophyllum delagoense</i> (mother of millions)			W	M
<i>Capsella bursa-pastoris</i> (shepherd's purse)				
<i>Cardaria draba</i> (hoary cress)	nc			
<i>Carduus nutans</i> (nodding thistle)			nc	
<i>Carduus pycnocephalus</i> (slender thistle)			nc	
<i>Carduus tenuiflorus</i> (winged slender thistle)			nc	
<i>Carthamus lanatus</i> (saffron thistle)	W	H	W	L
<i>Cassinia arcuata</i> (sifton bush)				

Primary list of weeds considered at workshops	Orange		Dubbo	
	D ¹	I ²	D ¹	I ²
<i>Cenchrus incertus</i> and <i>C. longispinus</i> (spiny burr grass)	W	H	W	L
<i>Centaurea calcitrapa</i> (star thistle)	W	H		
<i>Centaurea melitensis</i> (Maltese cockspur)			nc	
<i>Centaurea solstitialis</i> (St. Barnaby's thistle)	W	M	W	H
<i>Centaureum erythraea</i> (centaury)			W	M
<i>Cerastium glomeratum</i> (mouse-eared chickweed)			nc	
<i>Cestrum parqui</i> (green cestrum)	W	H	W	H
<i>Chamaecytisus palmensis</i> (lucerne tree)			nc	
<i>Chenopodium album</i> (fat hen)			W	L
<i>Chenopodium ambrosioides</i> (Mexican tea)				
<i>Chenopodium murale</i> (nettle-leafed goosefoot)				
<i>Chloris virgata</i> (feathertop Rhodes grass)	W	M		
<i>Chondrilla juncea</i> (skeleton weed)			W	L
<i>Cirsium vulgare</i> (spear thistle)	W	H		
<i>Citrullus colocynthis</i> (colocynth)				
<i>Citrullus lanatus</i> (wild melon)				
<i>Conium maculatum</i> (hemlock)	W	H	nc	
<i>Convolvulus arvensis</i> (field bindweed)	nc		W	L
<i>Conyza bilbaoana</i> (fleabane)				
<i>Conyza bonariensis</i> (flax leaf fleabane)				
<i>Conyza canadensis</i> (Canadian fleabane)				
<i>Coreopsis lanceolata</i> (coreopsis)			nc	
<i>Coronopus didymus</i> (lesser swinecress)			nc	
<i>Cotoneaster franchetii</i> (cotoneaster)			nc	
<i>Crataegus monogyna</i> (hawthorn)	W	H	nc	
<i>Crepis capillaris</i> (smooth hawkesbeard)	W	M	nc	
<i>Crotalaria</i> spp. (rattlepods)				
<i>Cynodon dactylon</i> (couch)				
<i>Cyperus eragrostis</i> (umbrella sedge)	W	H	W	M
<i>Cyperus rotundus</i> (nutgrass)				
<i>Cytisus scoparius</i> (Scotch broom, English broom)	W	H	nc	
<i>Dactylis glomerata</i> (cocksfoot)			nc	
<i>Datura ferox</i> (fierce thornapple)			W	L
<i>Datura stramonium</i> (thornapple)			W	M
<i>Daucus glochidiatus</i> (wild carrot)				
<i>Digitaria ciliaris</i> (crab grass)				
<i>Digitaria sanguinalis</i> (summer grass)				
<i>Dittrichia graveolens</i> (stinkwort)			W	M
<i>Echinochloa crus-galli</i> (barnyard grass)				
<i>Echium plantagineum</i> (Paterson's curse)	W	M	W	M
<i>Echium vulgare</i> (viper's bugloss)	W	M	nc	
<i>Eleusine indica</i> (crowsfoot grass)			nc	
<i>Emex australis</i> (spiny emex, cats head)			W	
<i>Eragrostis cilianensis</i> (stinkgrass)				

Primary list of weeds considered at workshops	Orange		Dubbo	
	D ¹	I ²	D ¹	I ²
<i>Eragrostis curvula</i> (African lovegrass)	W	M		
<i>Erodium moschatum</i> (crowsfoot, storksbill)				
<i>Euphorbia peplus</i> (petty spurge)				
<i>Genista monspessulana</i> (Montpellier broom, cape broom)	W	H	nc	
<i>Gleditsia triacanthos</i> (honey locust)			W	H
<i>Heliotropium amplexicaule</i> (blue heliotrope)	W	H	W	H
<i>Hirschfeldia incana</i> (Buchan weed)				
<i>Holcus lanatus</i> (Yorkshire fog)	W	L	nc	
<i>Hordeum</i> spp. (barley grass)	W	M	W	L
<i>Hyparrhenia hirta</i> (Coolatai grass)	W	L		
<i>Hypericum perforatum</i> (St John's wort)	W	H	W	H
<i>Hypochaeris radicata</i> (flatweed)	W	H	nc	
<i>Juncus acutus</i> (spiny rush)			W	M
<i>Juncus articulatus</i> (jointed rush)	W	M		
<i>Lactuca serriola</i> (prickly lettuce)	W	M	W	L
<i>Lamium amplexicaule</i> (deadnettle)			nc	
<i>Lepidium africanum</i> (peppergrass)				
<i>Ligustrum lucidum</i> (large-leaf privet)	W	H	W	H
<i>Ligustrum sinense</i> (narrow-leaf privet)	W	H	W	H
<i>Lolium perenne</i> (perennial ryegrass)				
<i>Lolium rigidum</i> (annual ryegrass)				
<i>Lycium ferocissimum</i> (African boxthorn)			W	H
<i>Malva parviflora</i> (small-flowered mallow)				
<i>Marrubium vulgare</i> (horehound)	W	L	W	M
<i>Medicago sativa</i> (lucerne)			nc	
<i>Medicago</i> spp. (medics (annual))				
<i>Modiola caroliniana</i> (small-flowered mallow)	W	M	nc	
<i>Nassella trichotoma</i> (serrated tussock)	W	H	nc	
<i>Onopordum acanthium</i> (Scotch thistle)	W	L	nc	
<i>Onopordum illyricum</i> (Illyrian thistle)			nc	
<i>Opuntia aurantiaca</i> (tiger pear)			W	H
<i>Opuntia stricta</i> (prickly pear)			W	H
<i>Oxalis articulata</i> (shamrock oxalis)				
<i>Oxalis pes-caprae</i> (soursob)				
<i>Papaver aculeatum</i> (bristle poppy)				
<i>Papaver dubium</i> (long-head poppy)				
<i>Papaver hybridum</i> (rough poppy)				
<i>Papaver somniferum</i> (opium poppy)				
<i>Paspalum dilatatum</i> (paspalum)				
<i>Pavonia hastata</i> (pavonia)				
<i>Pennisetum villosum</i> (feather grass)				
<i>Phalaris aquatica</i> (phalaris)	W	H	nc	

Primary list of weeds considered at workshops	Orange		Dubbo	
	D ¹	I ²	D ¹	I ²
<i>Phyla canescens</i> (lippia)	W	H	W	H
<i>Pinus radiata</i> (radiata pine)	W	H	W	H
<i>Plantago lanceolata</i> (lamb's tongue)				
<i>Poa labillardieri</i> (poa tussock)			nc	
<i>Polygonum aviculare</i> (wireweed)				
<i>Portulaca oleracea</i> (purslane)				
<i>Pyracantha fortuneana</i> (firethorn)	W	M	nc	
<i>Ranunculus muricatus</i> (sharp buttercup)	W	M		
<i>Raphanus raphanistrum</i> (wild radish)				
<i>Rapistrum rugosum</i> (turnip weed)				
<i>Reseda luteola</i> (wild mignonette)				
<i>Ricinus communis</i> (castor oil plant)	nc		W	M
<i>Robinia pseudoacacia</i> (black locust)	W	H	W	H
<i>Romulea rosea</i> (onion grass)	W	M		
<i>Rorippa nasturtium-aquatica</i> (watercress)	W	H	W	M
<i>Rosa rubiginosa</i> (sweet briar)	W	M	nc	
<i>Rubus fruticosus</i> agg. (blackberry)	W	H	W	H
<i>Rumex crispus</i> (docks)	W	H	W	L
<i>Salix</i> spp. (willows)	W	H	W	H
<i>Salsola kali</i> (soft roly poly)	nc			
<i>Sclerolaena birchii</i> (galvanised burr)	nc			
<i>Sclerolaena muricata</i> (black roly poly)	nc		W	L
<i>Senna barclayana</i> (pepperleaf senna)			W	H
<i>Setaria verticillata</i> (whorled pigeon grass)				
<i>Sida rhombifolia</i> (Paddy's lucerne)			W	M
<i>Silybum marianum</i> (variegated thistle)	W	H		
<i>Sisymbrium irio</i> (London rocket)				
<i>Sisymbrium officinale</i> (hedge mustard)				
<i>Sisymbrium orientale</i> (Indian hedge mustard)				
<i>Solanum cinereum</i> (Narrawa burr)			W	H
<i>Solanum elaeagnifolium</i> (silver-leaf nightshade)			W	L
<i>Solanum nigrum</i> (blackberry nightshade)				
<i>Solanum triflorum</i> (three-flowered nightshade)				
<i>Soliva sessilis</i> (bindii)				
<i>Sonchus asper</i> (rough sowthistle)			W	L
<i>Sonchus oleraceus</i> (sowthistle)				
<i>Sorghum halepense</i> (Johnson grass)	W	H		
<i>Stachys arvensis</i> (stagger weed)				
<i>Stellaria media</i> (chickweed)			nc	
<i>Taraxacum officinale</i> (dandelion)				
<i>Tribulus terrestris</i> (caltrop)	W	M	W	L
<i>Trifolium repens</i> (white clover)				
<i>Trifolium</i> spp. (annual clovers)				

Primary list of weeds considered at workshops	Orange		Dubbo	
Scientific name (Common name)	D ¹	I ²	D ¹	I ²
<i>Ulex europaeus</i> (gorse)	W	L	nc	
<i>Urochloa panicoides</i> (liverseed grass)				
<i>Urtica incisa</i> (scrub nettle)	W	M		
<i>Urtica urens</i> (stinging nettle)	W	H	W	L
<i>Vallisneria</i> sp. (ribbon weed)				
<i>Verbascum thapsus</i> (great mullein)				
<i>Verbascum virgatum</i> (twiggy mullein)				
<i>Verbena bonariensis</i> (purpletop)	W	M	W	M
<i>Verbena officinalis</i> (common verbena)	W	M		
<i>Verbena rigida</i> (veined verbena)				
<i>Vicia hirsuta</i> (hairy vetch)				
<i>Vicia sativa</i> (common vetch)				
<i>Vulpia</i> spp. (rats tail fescue, vulpia)	W	L	nc	
<i>Xanthium occidentale</i> and <i>X. italicum</i> (Noogoora burr)	W	H	W	H
<i>Xanthium spinosum</i> (Bathurst burr)				

¹Distribution (D) abbreviations: W = widespread;

blank cells = species not considered to be widespread in the catchment or distribution unknown.

²Impact (I) abbreviations: H = high; M = medium; L = low.

Table B7. Weeds added by workshop participants in the CWCMA region

Weeds added by workshop participants	Orange		Dubbo	
Scientific name (Common name)	D ¹	I ²	D ¹	I ²
<i>Asparagus asparagoides</i> (bridal creeper)	nc		W	L
<i>Cineraria lyrata</i> (cineraria)			nc	
<i>Melia azedarach</i> (white cedar)	nc		W	H
<i>Schinus areira</i> (pepper tree)	nc		W	H
<i>Schinus molle</i> (pepper tree)	nc			

¹Distribution (D) abbreviations: W = widespread;

blank cells = species not considered to be widespread in the catchment or distribution unknown.

²Impact (I) abbreviations: H = high; M = medium; L = low.

**APPENDIX B4.
TEMPLATE OF LETTER SENT TO PRIVATE LANDHOLDERS WITH
VOLUNTARY CONSERVATION AGREEMENTS OR WILDLIFE REFUGES
ON THEIR PROPERTIES**

Date

Address

Dear

I am involved in a project with the NSW Department of Environment and Climate Change (DECC), NSW Department of Primary Industries (DPI) and Catchment Management Authorities (CMAs) in NSW. The project is identifying widespread weeds that are impacting on biodiversity in each catchment through a series of workshops.

These workshops have already been held in the Central West CMA. (A list of the high impact weeds with an indication of the types of vegetation under threat is attached). The next step is to identify sites of high biodiversity value under invasion from weeds that would benefit from weed control. We have developed a site nomination form for this purpose and instructions for completing the form (attached). Site nominations within each CMA will be collated and prioritised as part of the project. This list of sites will then be given to the Central West CMA to assist them in prioritising investment for on-ground works in the future.

As you have a Conservation Agreement or a Wildlife Refuge on your property, you may have a site that could be nominated under this project. Please consider nominating a site on your property if you consider it of high biodiversity value and if weed control would benefit the overall biodiversity or threatened species (plants, birds and animals).

For more information about the project please visit the website (below).

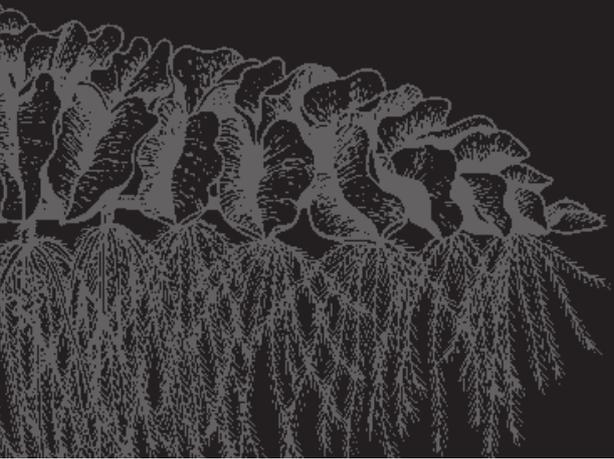
Yours sincerely

Bruce Auld

Project Officer (Weed Evaluation)

NSW DPI, DECC CMA Biodiversity Project

Adjunct Professor Charles Sturt University



BIODIVERSITY PRIORITIES FOR WIDESPREAD WEEDS

Catchment Management Authority Regions

- Part A | Border Rivers–Gwydir
- Part B | Central West
- Part C | Hawkesbury–Nepean
- Part D | Hunter–Central Rivers
- Part E | Lachlan
- Part F | Lower Murray Darling
- Part G | Murray
- Part H | Murrumbidgee
- Part I | Namoi
- Part J | Northern Rivers
- Part K | Southern Rivers
- Part L | Sydney Metropolitan
- Part M | Western



Primary
Industries



Office of
Environment
& Heritage



Catchment
Management
Authorities



Australian Government