



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

Southern Rivers CMA region

Part K



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K1. 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 Southern Rivers Catchment Management Authority (SRCMA) 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*, details 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 K) establishes regional priorities, in the form of priority widespread weeds and priority sites for control, in the SRCMA region.

The SRCMA region covers more than 29,000 square kilometres with landscapes ranging from temperate rainforests, wide open grasslands, extensive coastal estuaries and lakes and intermittently flowing coastal streams (SRCMA 2009). Approximately 450,000 people live in the region and land uses include industry, primary production and urban and residential areas. About 65% of the region is publicly managed mostly in National Parks or State Forests and Crown Lands, the remainder is privately managed agricultural, lifestyle and urban land. This large area of publicly managed land provides an excellent base for biodiversity conservation and also provides a range of ecosystem services including clean water, clean air and aesthetic amenity which are highly valued by residents and visitors alike (SRCMA 2009).

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 98 weeds in the SRCMA region were threatening biodiversity, including 58 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 SRCMA 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 SRCMA 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 SRCMA to measure progress towards relevant targets, including the Natural Resource Commission (NRC) target for invasive species (NRC 2005) and Catchment Action Plan (CAP) targets.

K2. REGIONAL CONTEXT

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

K2.1 Catchment Action Plan

Under the *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 SRCMA CAP outlines catchment targets for four themes: (i) biodiversity, (ii) soil and land capability, (iii) water and (iv) coastal and marine. A series of management targets for each resource condition target illustrate how the CMA will invest in and measure progress towards natural resource management (SRCMA 2006).

This widespread weed project will primarily contribute to four key management targets for biodiversity and water:

Biodiversity Catchment Targets:

Aim: (i) by 2016 there is an improvement in vegetation condition and an increase in connectivity and extent, (ii) by 2016 the regional status of priority threatened and regionally significant species, ecological communities and populations within the catchment is improved or maintained.

- » B4 (native species conservation): By 2016 the priority recovery actions identified in the Southern Rivers threatened species strategy will have been implemented.
- » B5 (invasive species threats): By 2016 priority weed species will be controlled at key locations.

Water Catchment Targets:

- » W5-a: By 2016 an additional 2,000 ha of riparian vegetation will be actively managed for improved riverine ecosystem condition.
- » W5-d: By 2016 priority actions and works will be implemented to protect and enhance 40 wetlands of national and regional importance identified as priorities.

K2.2 Southern Rivers Sub-regional Weed Strategies (draft)

Draft sub-regional weed strategies have been developed as a tool to assist stakeholders to develop weed management projects in line with regional and local priorities. The sub-regional weeds strategies determine priority areas at a sub-regional scale where stakeholders can take actions to control weeds. The priorities for the sub-regional weed strategies and this strategy were developed in the same timeframe and should reflect best management options for each region. Progress on these strategies has stalled and they remain in draft format.

K2.3 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)). The committees relevant to SRCMA are the Southern Tablelands and South Coast Noxious Plants Committee.

Regional weed management plans are developed by regional weeds advisory committees and target specific noxious weed species for control within a defined area. 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 Southern Tablelands and South Coast Noxious Plants Committee has developed a number of regional weed plans including, St Johns wort (*Hypericum perforatum*), serrated tussock (*Nassella trichotoma*), lantana (*Lantana camara*), African lovegrass (*Eragrostis curvula*), Chilean needle grass (*Nassella neesiana*), broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), fireweed (*Senecio madagascariensis*), bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*), giant Parramatta grass (*Sporobolus fertilis*), blackberry (*Rubus fruticosus* agg.) and groundsel bush (*Baccharis halimifolia*).

K2.4 Illawarra Escarpment Strategic Management Plan

The Illawarra Escarpment Strategic Management Plan was prepared to provide guidance, a decision-making framework, and strategies and actions to be implemented by all stakeholders and land managers within the Escarpment area. The Illawarra Escarpment Strategic Management Plan identifies priority weeds species and areas to facilitate the allocation of resources, allows the management of weeds through land-use planning and provides a strategy to prevent new weed problems and educate the community about weeds (WCC 2008).

The priorities identified in the Illawarra Escarpment Strategic Management Plan were considered as part of this project when collating the Southern Rivers Catchment weeds dataset (see 3.2.1 Stage 1 below).

K2.5 Draft Weed Action Plan for Lower Shoalhaven Zone

The Draft Weed Action Plan for Lower Shoalhaven Zone was initiated in 2004 by the Lower Shoalhaven Weeds Committee in consultation with the Southern Tablelands and South Coast Noxious Plant Committee (LSWC Draft 2005). Progress on the plan was stalled and it remains in draft format. The document identifies the current situation (distribution), priority sites, containment zones and key actions for weeds of regional significance. Information on threatened species and EECs at risk from weeds identified in the Draft Weed Action Plan for Lower Shoalhaven Zone (LSWC Draft 2005) have been used to supplement information obtained from stakeholder workshops (see 3.2.2 – Stage 2 below).

K2.6 Office of Environment & Heritage (OEH) regional pest management strategies

Within the SRCMA the NPWS (part of OEH) administers significant land for conservation purposes. Weed management priorities on NPWS estate are 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 five strategies relevant to the Southern Rivers region: (i) Snowy Mountains, (ii) Far South Coast, (iii) South West Slopes, (iv) Sydney South and (v) South Coast strategies (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 surveys, including those priority widespread weeds and biological assets at risk, are incorporated into this project (see Section 1.6.1 of the *statewide framework*).

K2.7 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 34 actions in the PAS relevant to weed management in the SRCMA region (Appendix K1). Of these, 20 actions are either associated with implementation of the NSW bitou bush threat abatement plan (TAP) (DEC 2006) or are generic, recommending targeted bush regeneration or general weed management. Only 14 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.

K3. REGIONAL OUTPUTS

K3.1 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 *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 SRCMA 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*.

K3.1.1 Workshops in the SRCMA region

Two rounds of stakeholder workshops were held to coincide with the development of sub-regional weed strategies in the CMA during August-September 2007 and in February-March 2008. A total of two one-day workshops were held in each of the six sub-regions: Bega, Eurobodalla (held in Moruya), Monaro (held in Cooma), Upper Shoalhaven (held in Braidwood), Lower Shoalhaven (held in Nowra) and Illawarra (held in Wollongong). Representatives from councils, state agencies, community groups, consultants and private landholders attended the workshops. See Appendix K2 for a full list of attendees.

K3.1.2 SRCMA specific webpages

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

K3.2 The process

K3.2.1 Stage 1. Identifying weeds that pose a threat in the SRCMA region

A weeds dataset for the SRCMA region

A list of weeds to consider at the workshops was collated using the resources outlined in Section 3.2 of the *statewide framework*, those listed in Section K2 and noxious weed listings for all relevant Local Government Areas.

Distribution of weeds within the SRCMA region

The weeds dataset for the SRCMA region was presented to workshop participants, who were asked to identify the current distribution of each of the weeds in six sub-regions (Monaro, Upper Shoalhaven, Eurobodalla, Bega, Lower Shoalhaven and Illawarra) according to the categories outlined in Table K1. The distribution for each weed considered, plus weeds added by participants, are provided in Appendix K4.

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 K2). Thirty nine widespread weeds were identified as having a high impact on biodiversity at one or more of the workshops and constituted a draft list of priority weeds that was distributed to workshop participants and other stakeholders for comment. Stakeholder comments were incorporated in the list, which is presented in Table K3. Sub-region specific weeds are presented in Appendix K3. The Lower Shoalhaven sub-region had the highest number of high priority weeds identified (22), followed by Bega (20), Illawarra (18), Monaro (6) and the Upper Shoalhaven (4).

Table K1. Definitions of spatial weed distribution categories, as used in stakeholder workshops.

Category	Definition
Widespread*	Species that have established well in the landscape and are close to reaching their maximum potential distribution in the region or sub-region
Localised	Species confined to small, local infestations only.
Emerging	Species perceived as threatening that have been recorded in the region but only in isolated instances or in small areas. Populations of the weed are expanding rapidly but they have not yet become widely established.
Alert	Species that do not currently occur in the region but have the potential to be introduced and would have significant impacts on natural systems if they were to invade.

* Given the large variation in environmental conditions at the CMA regional scale it is likely that very few weeds will be widespread across the entire area under consideration. For this reason participants were asked to consider the current distribution of the weed in relation to its future potential distribution within the region. To do this, a consideration of the preferred habitat conditions of each weed is necessary. For example, riparian weeds will only grow in riparian environments. If a particular riparian weed is widespread within these environments then it is considered widespread across the region. In addition, species that are widespread in tablelands areas, for instance, are unlikely to be widespread in the plains areas of the same region.

Table K2. 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 they have relatively short life spans.

Table K3. Priority widespread weeds impacting on biodiversity in the Southern Rivers CMA region (listed in alphabetical order).

Scientific name (Common name)	KTP ¹	WoNS ²	Noxious	
			NSW ³	LGA ⁴
<i>Acetosa sagittata</i> (turkey rhubarb)	Y			
<i>Achillea millefolium</i> (yarrow)	Y*			
<i>Ageratina adenophora</i> (crofton weed)	Y*			Y
<i>Ageratina riparia</i> (mistflower)	Y*			Y
<i>Ailanthus altissima</i> (tree of heaven)	Y*			
<i>Anredera cordifolia</i> (Madeira vine)	Y			
<i>Araujia sericifera</i> (moth vine/mothplant)	Y			
<i>Arundo donax</i> (giant reed)				
<i>Asparagus aethiopicus</i> (asparagus fern)	Y			
<i>Asparagus asparagoides</i> (bridal creeper)	Y	Y	5	
<i>Bryophyllum delagoense</i> (mother of millions)	Y*			
<i>Caulerpa taxifolia</i> (caulerpa)				
<i>Chloris gayana</i> (Rhodes grass)	Y			
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)	Y	Y		Y
<i>Conium maculatum</i> (hemlock)				Y
<i>Cytisus scoparius</i> (Scotch broom)	Y			Y
<i>Delairea odorata</i> (Cape ivy)	Y			
<i>Ehrharta erecta</i> (panic veldtgrass)	Y			
<i>Eragrostis curvula</i> (African lovegrass)	Y			Y
<i>Erythrina sykesii</i> (coral tree)	Y*			
<i>Euphorbia paralias</i> (sea spurge)				
<i>Hypericum perforatum</i> (St John's wort)	Y*			Y
<i>Ipomoea</i> spp. (morning glory)	Y			
<i>Juncus acutus</i> (spiny rush)				
<i>Lagunaria patersonii</i> (Norfolk Island hibiscus)				
<i>Lantana camara</i> (lantana)	Y	Y	5	Y
<i>Ligustrum lucidum</i> (large-leaf privet)	Y*			Y
<i>Ligustrum sinense</i> (small-leaf privet)	Y*			Y
<i>Lonicera japonica</i> (Japanese honeysuckle)	Y			
<i>Nassella trichotoma</i> (serrated tussock)	Y	Y		Y
<i>Pennisetum clandestinum</i> (kikuyu)	Y			
<i>Polygala myrtifolia</i>	Y*			
<i>Polygala virgata</i>				
<i>Populus</i> spp. (poplar)				
<i>Rubus fruticosus</i> agg. (blackberry)	Y*	Y	4	
<i>Salix</i> spp. (willows)	Y*	Y	5	
<i>Senecio madagascariensis</i> (fireweed)				Y
<i>Senna pendula</i> (cassia/senna)	Y*			
<i>Tradescantia fluminensis</i> (trad)	Y			
<i>Vinca major</i> (blue periwinkle)	Y			

KTP¹ = Weed listed under a Key Threatening Process in the TSC Act; WoNS² = Weeds of National Significance (Thorp and Lynch 2000); NSW³ = 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 as at 31 August 2010. Numbers in the table refer to the control class under the NSW *Noxious Weeds Act 1993*.

K3.2.2 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 species (as listed under the TSC Act and EPBC Act), as well as general vegetation types present in the SRCMA region. They were asked to consider if any 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 list also incorporated information from the Draft Weed Action Plan for Lower Shoalhaven Zone (LSWC Draft 2005).

The revised list identified EECs and threatened species that are considered under threat from the high priority weeds (Tables K4a-f). This information was used to help guide site nominations (see Stage 3, section 3.2.3).

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 also 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 communities impacted by the greatest number of widespread weeds in each sub-region were Riparian/River Systems in Bega (14 weeds impacting), Riparian Areas in Monaro (5 weeds impacting), Natural Temperate Grasslands EEC in the Upper Shoalhaven (2 weeds impacting), Bangalay Sand Forest EEC in Eurobodalla (8 weeds impacting) and Illawarra Sub-tropical Rainforest EEC in the Lower Shoalhaven and Illawarra (7 and 9 weeds impacting). The weeds impacting the greatest number of vegetation communities included in each sub-region were St John's wort (*Hypericum perforatum*) in Monaro (4 communities), African lovegrass (*Eragrostis curvula*), serrated tussock (*Nassella trichotoma*) and Scotch broom (*Cytisus scoparius*) in the Upper Shoalhaven (1 community), veldtgrass (*Ehrharta* sp.) in Eurobodalla (5 communities), kikuyu (*Pennisetum clandestinum*) in Bega (9 communities), lantana (*Lantana camara*) in the Lower Shoalhaven (3 communities) and moth vine (*Araujia sericifera*) in the Illawarra.

For the SRCMA region the NSW bitou bush threat abatement plan (DEC 2006) and the national plan to protect environmental assets from lantana (National Lantana Management Group 2010) also list the biodiversity at risk from bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*) and lantana (*Lantana camara*) (see www.environment.nsw.gov.au/bitouTAP/biodiversityatrisk.htm and www.environment.nsw.gov.au/lantanaplan/biodiversityatrisk.htm).

K3.2.3 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 the *statewide framework*) were emailed to key stakeholders (including workshop participants), and placed on the SRCMA 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 SRCMA region, along with a letter outlining the aims of the project (Appendix K5) 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.

Categories for control

The 244 sites nominated to date (as at 31 August 2010) for the SRCMA region were separated into six categories using the 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 84 sites in control category 1 (Table K5). 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 this category. Nominated sites were deemed invalid for ranking if three or more of the required fields contained insufficient information.

K3.2.4 Review and additional site nominations

A draft of this report was provided to SRCMA for comment and review on 10 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. As this framework is applicable to all widespread weeds impacting on biodiversity, sites in New South Wales that were previously included in the Bitou TAP (DEC 2006) and national lantana plan (National Lantana Management Group 2010) were incorporated into this project.

Further site nominations were then sought and all nominations received from 2009 to August 2010 were included and then ranked. However, the site nomination process is ongoing and should be used by SRCMA 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 K4a. Biodiversity under threat from priority widespread weeds in the Monaro sub-region.

Priority widespread weed	Endangered Ecological Community				Vegetation community
	Box Gum Woodland	Candelo Dry Grass Forest	Montane Peatlands and Swamps	Natural Temperate Grasslands	
<i>Scientific name</i> (Common name)					Riparian Areas
<i>Achillea millefolium</i> (yarrow)			P		
<i>Eragrostis perforatum</i> (African lovegrass)					
<i>Hypericum perforatum</i> (St John's wort)			P		
<i>Nassella trichotoma</i> (serrated tussock)					
<i>Rubus fruticosus</i> agg. (blackberry)			P		
<i>Salix</i> spp. (willows)					

P = a potential impact in communities.

Table K4b. Biodiversity under threat from priority widespread weeds in the Upper Shoalhaven sub-region.

Priority widespread weed	Endangered Ecological Community					Vegetation community
<i>Scientific name</i> (Common name)	Natural Temperate Grasslands	Robertson Basalt Tall Open Forest	Box Gum Woodland	Montane Peatlands and Swamps	Riparian Areas	
<i>Eragrostis curvula</i> (African lovegrass)						
<i>Nassella trichotoma</i> (serrated tussock)						
<i>Rubus fruticosus</i> agg. (blackberry)						
<i>Cytisus scoparius</i> (Scotch broom)						

Table K4c. Biodiversity under threat from priority widespread weeds in the Eurobodalla sub-region.

Priority widespread weed <i>Scientific name</i> (Common name)	Endangered Ecological Community														
	Bangalay Sand Forest	Bega Dry Grass Forest	Box Gum Woodland	Brogo Wet Vine Forest	Candelo Dry Grass Forest	Coastal Saltmarsh	Dry Rainforest of the South East Forests	Freshwater Wetlands on Coastal Floodplains	Littoral Rainforest	Montane Peatlands and Swamps	Natural Temperate Grasslands	River Flat Eucalypt Forest	Robertson Basalt Tall Open Forest	Swamp Oak Floodplain Forest	Themedra Grasslands
Threatened species <i>Scientific name</i> (Common name)*															
<i>Anredera cordifolia</i> (Madeira vine)															
<i>Asparagus aethiopicus</i> (asparagus fern)															
<i>Asparagus asparagoides</i> (bridal creeper)															
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)															
<i>Sminthopsis leucopus</i> (white-footed dunnart)*															
<i>Delairea odorata</i> (Cape ivy)															
<i>Haloragis exalata</i> (raspwort)*, <i>Zieria tuberculata</i> (warty zieria)*															
<i>Ehrharta erecta</i> (veldtgrass)															
<i>Euphorbia paralias</i> (sea spurge)															
<i>Sterna albifrons</i> (little tern)*, <i>Thinornis rubricollis</i> (hooded plover)*															
<i>Juncus acutus</i> (spiny rush)															
various threatened saltmarsh species*															
<i>Lantana camara</i> (lantana)															
<i>Zieria tuberculata</i> (warty zieria)*															
<i>Pennisetum clandestinum</i> (kikuyu)															
<i>Zieria tuberculata</i> (warty zieria)*															
<i>Rubus fruticosus</i> agg. (blackberry)															
<i>Senecio madagascariensis</i> (fireweed)															

Table K4d. Biodiversity under threat from priority widespread weeds in the Bega sub-region.

Priority widespread weed <i>Scientific name</i> (Common name)	Endangered Ecological Community											Vegetation community						
	Bangaalay Sand Forest	Brogo Wet Vine Forest	Bega Dry Grass Forest	Candelo Dry Grass Forest	Coastal Saltmarsh	Dry Rainforest of the South East Forests	Freshwater Wetlands	Littoral Rainforest	Montane Peatlands and Swamps	Natural Temperate Grasslands	River Flat Eucalypt Forest	Swamp Oak Floodplain Forest	Themeda Grasslands	Riparian/River Systems	Coastal Vegetation	Dry Grass Forest	Wetlands	Warm Temperate Rainforest
<i>Acetosa sagittata</i> (turkey rhubarb)								P										
<i>Anredera cordifolia</i> (Madeira vine)								P										
<i>Araujia sericifera</i> (moth vine)								P										
<i>Asparagus asparagoides</i> (bridal creeper)																		
<i>Conium maculatum</i> (hemlock)																		
<i>Delairea odorata</i> (Cape ivy)																		
<i>Ehrharta erecta</i> (panic veldtgrass)																		
<i>Eragrostis curvula</i> (African lovegrass)																		
<i>Euphorbia paralias</i> (sea spurge)										P								
<i>Lonicera japonica</i> (Japanese honeysuckle)								P										
<i>Nassella trichotoma</i> (serrated tussock)																		
<i>Pennisetum clandestinum</i> (kikuyu)																	P	
<i>Polygala myrtifolia</i>																		
<i>Polygala virgata</i>																		
<i>Populus</i> spp. (poplar)																		
<i>Rubus fruticosus</i> agg. (blackberry)																		
<i>Salix</i> spp. (willows)																		
<i>Senecio madagascariensis</i> (fireweed)																		
<i>Tradescantia fluminensis</i> (trad)																		
<i>Vinca major</i> (blue periwinkle)																		

P = a potential impact in communities.

Table K4e. Biodiversity under threat from priority widespread weeds in the Lower Shoalhaven sub-region.

Priority widespread weed <i>Scientific name</i> (Common name)	Endangered Ecological Community					
	Coastal Saltmarsh	Illawarra Sub-tropical Rainforest	Littoral Rainforest	Milton-Ulladulla Sub-tropical Rainforest	River Flat Eucalypt Forest	Swamp Oak Floodplain Forest
<i>Acetosa sagittata</i> (turkey rhubarb)						
<i>Ageratina adenophora</i> (crofton weed)						
<i>Ageratina riparia</i> (mistflower) <i>Irenepharsus trypherus</i> (Illawarra Irene)*						
<i>Ailanthus altissima</i> (tree of heaven)						
<i>Anredera cordifolia</i> (Madeira vine)						
<i>Araujia sericifera</i> (moth vine)						
<i>Asparagus aethiopicus</i> (asparagus fern)						
<i>Asparagus asparagoides</i> (bridal creeper)						
<i>Bryophyllum delagoense</i> (mother of millions)						
<i>Caulerpa taxifolia</i> (caulerpa)						
<i>Chloris gayana</i> (Rhodes grass)						
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)						
<i>Delairea odorata</i> (Cape ivy) <i>Chamaesyce psammogeton</i> (sand spurge)*						
<i>Erythrina sykesii</i> (coral tree)						
<i>Euphorbia paralias</i> (sea spurge)						
<i>Ipomoea</i> spp. (morning glory)						
<i>Juncus acutus</i> (spiny rush)						
<i>Lantana camara</i> (lantana)						
<i>Ligustrum lucidum</i> (large-leaf privet)						
<i>Ligustrum sinense</i> (small-leaf privet)						
<i>Senna pendula</i> (cassia, senna (smooth))						
<i>Tradescantia fluminensis</i> (trad)						

Table K4f. Biodiversity under threat from priority widespread weeds in the Illawarra sub-region.

Priority widespread weed	Endangered Ecological Community													Vegetation community
	Coastal Saltmarsh	Freshwater Wetland	Illawarra Lowlands Grassy Woodland	Illawarra Sub-tropical Rainforest	Littoral Rainforest	Robertson Basalt Tall Open Forest	Robertson Rainforest	Swamp Oak Floodplain Forest	<i>Melaleuca armillaris</i> Tall Shrubland	Montane Peatlands and Swamps	River Flat Eucalypt Forest	Southern Highlands Shale Woodland	Swamp Sclerophyll Forest and Coastal Floodplain	
<i>Acetosa sagittata</i> (turkey rhubarb)														
<i>Ageratina adenophora</i> (crofton weed)														
<i>Ageratina riparia</i> (mistflower)														
<i>Anredera cordifolia</i> (Madeira vine)														
<i>Araujia sericifera</i> (moth vine)														
<i>Arundo donax</i> (giant reed)														
<i>Asparagus</i> spp. (asparagus)														
<i>Chloris gayana</i> (Rhodes grass)														
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)														
<i>Delairea odorata</i> (Cape ivy)														
<i>Erythrina sykesii</i> (coral tree)														
<i>Ipomoea</i> sp. (morning glory)														
<i>Lantana camara</i> (lantana)														
<i>Ligustrum lucidum</i> (large-leaf privet)														
<i>Ligustrum sinense</i> (small-leaf privet)														
<i>Pennisetum clandestinum</i> (kikuyu)														
<i>Salix</i> spp. (willows)														
<i>Tradescantia fluminensis</i> (trad)														

Table K5. The number of sites in each of the six categories.

	Categories						Not valid [^]	Total
	1*	2	3	4	5	6		
Number of sites	84	30	37	52	20	6	15	244

*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.

K4. SUMMARY FOR SOUTHERN RIVERS 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 established here 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.

K4.1 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 weeds*'.

The list of priority sites, weed species and biodiversity outlined here for the SRCMA region can also be used to meet a range of CMA priorities. This project directly addresses the SRCMA CAP targets as outlined in Section K2.1, 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 SRCMA. 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).

K4.2 Biodiversity conservation and widespread weed management

The list of priority sites provides strategic direction for on-ground works by identifying areas where weed control programs 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 SRCMA 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 general 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 SRCMA region 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*).

K4.3 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 SRCMA region. As conditions or management requirements change at existing sites, and as information on new sites becomes available, they can be included in the Southern Rivers site spreadsheet for subsequent re-ranking at a future point (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 SRCMA contained site nominations received before December 2008. Any site nominations received during 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 SRCMA for inclusion in the site spreadsheet and sites should subsequently be re-ranked by SRCMA.

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.

K5. REFERENCES

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K6. APPENDICES

Appendix K1: Current actions in the Priorities Action Statement relating to weed management in the Southern Rivers CMA region

Appendix K2: Attendees at SRCMA weed impacts to biodiversity workshops

Appendix K3: Priority widespread weeds impacting on biodiversity for each of the six sub-regions in the Southern Rivers CMA region

Appendix K4: Weeds considered at the workshops in the SRCMA region, their distribution and their relative impact on biodiversity

Appendix K5: Template of letter sent to private landholders with voluntary conservation agreements or wildlife refuges on their properties

**APPENDIX K1.
CURRENT ACTIONS IN THE PRIORITIES ACTION STATEMENT RELATING
TO WEED MANAGEMENT IN SOUTHERN RIVERS CMA REGION**

Threatened species, populations and communities	Level of threat	Priority actions in PAS relating to weed management
High priority		
<i>Acacia georgensis</i>	V	Control African lovegrass at Bega Wattle site (AG5) and coordinate control in the vicinity. Eradicate African lovegrass at Dr. George Mtn and monitor re-establishment.
<i>Aldrovanda vesiculosa</i>	E	Environmentally sensitive control of <i>Salvinia molesta</i> .
Bega Dry Grass Forest in the South East Corner Bioregion	E	Target priority weeds for control.
Candelo Dry Grass Forest in the South East Corner Bioregion	E	Target priority weeds for control.
<i>Chamaesyce psammogeton</i>	E	Undertake bitou bush/boneseed control; giving priority to sites identified in the TAP.
<i>Dasyornis brachypterus</i>	E	Control bitou bush in habitat in southern NSW.
<i>Galium australe</i>	E	Assess threat posed by weeds particularly at sites adjacent to urban areas e.g. Hornsby LGA and liaise with relevant land managers to initiate a control and monitoring program as required.
Littoral Rainforest in the NSW North Coast; Sydney Basin and South East Corner Bioregions	E	Undertake weed control for bitou bush and boneseed at priority sites in accordance with the approved Threat Abatement Plan and associated PAS actions.
<i>Lysimachia vulgaris</i> var. <i>davurica</i>	E	Continue woody weed control in Wingecarribee Swamp and Burrumbowlie Swamp.
<i>Petalura gigantea</i>	E	Control invasion of <i>Pinus</i> species into Penrose Swamp; at swamp habitat within or adjoining Newnes SF and control weeds at sites adjoining urban areas or impacted by runoff from the Great Western Highway.
<i>Zieria tuberculata</i>	V	Undertake control of woody weeds; particularly lantana; at affected sites.
Medium priority		
<i>Acacia bynoeana</i>	E	Undertake targeted bush regeneration works; where required.
<i>Callitris oblonga</i>	V	Promote and coordinate a program to control blackberries and pine wildlings on private land in the lower parts of the Corang River.
<i>Chorizema parviflorum</i> Benth. (a shrub) population; Wollongong and Shellharbour local government areas	E	Control weeds at sites using bush regeneration techniques; where required.
<i>Discaria nitida</i>	V	Develop and implement a weed control programme for all sites.
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	V	Undertake targeted bush regeneration works; where required.
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast; Sydney Basin and South East Corner Bioregions	E	Undertake weed control for bitou bush and boneseed at priority sites in accordance with the approved Threat Abatement Plan and associated PAS actions.
<i>Haematopus fuliginosus</i>	V	Undertake weed control on off-shore islands used for breeding where required.
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	E	Undertake targeted bush regeneration work to restore and maintain remnants.
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	E	Undertake targeted bush regeneration work to restore and maintain remnants.
<i>Lespedeza juncea</i> subsp. <i>sericea</i> - endangered population	E	Control weeds at the site using approved bush regeneration techniques.

Threatened species, populations and communities	Level of threat	Priority actions in PAS relating to weed management
<i>Mastacomys fuscus</i>	V	Control exotic weeds; including blackberry; in areas of broad toothed rat habitat.
<i>Melaleuca armillaris</i> Tall Shrubland in the Sydney Basin Bioregion	E	Undertake targeted bush regeneration work to restore and maintain remnants.
<i>Melaleuca biconvexa</i>	V	Undertake targeted bush regeneration works; where required.
<i>Melaleuca deanei</i>	V	Undertake targeted bush regeneration works; where required.
<i>Sminthopsis leucopus</i>	V	Control weeds (e.g. bitou bush) where they are present near key habitats.
Swamp Oak Floodplain Forest of the NSW North Coast; Sydney Basin and South East Corner Bioregions	E	Undertake weed control for bitou bush and boneseed at priority sites in accordance with the approved Threat Abatement Plan and associated PAS actions.
<i>Themeda australis</i>	E	Undertake weed control for bitou bush and boneseed at priority sites in accordance with the approved Threat Abatement Plan and associated PAS actions.
<i>Thesium australe</i>	V	Implement bitou bush control as described in the approved TAP.

Low priority

<i>Miniopterus schreibersii oceanensis</i>	V	Undertake non-chemical removal of weeds (e.g. lantana; blackberry) to prevent obstruction of cave entrances.
<i>Potorous tridactylus</i>	V	Control weeds; particularly those that affect the understorey layer; in long-nosed potoroo habitat.
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast; Sydney Basin and South East Corner Bioregions	E	Undertake weed control for bitou bush and boneseed at priority sites in accordance with the approved Threat Abatement Plan and associated PAS actions.
<i>Syconycteris australis</i>	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.

Note: Although the species in this table are found in SRCMA some actions listed above are not specific to SRCMA.

V = listed as vulnerable under the TSC Act

E = listed as endangered under the TSC Act

**APPENDIX K2.
ATTENDEES AT THE SRCMA WEED IMPACTS TO BIODIVERSITY
WORKSHOPS**

Name	Organisation	Position
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Eurobodalla sub-region (23 August 2007 and/or 25 February 2008 at Moruya)

Brett Miners	SRCMA	Landscape Manager
Doug Gowen	TLPG	President
Graham Harding	Eurobodalla Shire Council	Noxious Weeds Officer
Harry Bate	Eurobodalla Fireweed Advisory Committee	Member
Jackie Miles	Consultant	
Keith Dance	Landholder	
Neale Watson	DECCW	Area Manager
Neville Cork	DECCW	Ranger
Peter Gow	Eurobodalla Shire Council	Landcare Community Support Officer
Tracey Rich	Eurobodalla Shire Council	Sustainability Officer
Peter Atkinson		
Kerry Davies		
Paula Pollock	Eurobodalla Shire Council	
Michael Michelmore	I&I NSW	Regional Weed Control Coordinator
Hayden Kingston	I&I NSW	District Agronomist
Kate Hoorweg	Forests NSW	
Andrew Taylor	SRCMA	
Trevor Daly	I&I NSW	
Deb Lenson	Eurobodalla Shire Council	

Bega sub-region (24 August 2007 and/or Bega 26 February 2008 at Bega)

Alan Smith	Bega Valley Shire Council	
Andrew Taylor	SRCMA	
Ann Herbert	Bega Valley Shire Council	
Brett Miners	SRCMA	
Derek Lewis	Towamba Landcare	Secretary
Don McPhee	SRCMA	Catchment Coordinator
Hayden Kingston	I&I NSW	District Agronomist
Jackie Miles	Consultant	
James White		
John Carter	Far South Coast Landcare	Committee Member
Justin Gouvernet	SRCMA	Catchment Officer
Ken Northcott		
Michael Michelmore	I&I NSW	Regional Weed Control Coordinator
Peter Windle	DECCW	Project Officer Fire/Pests
Stuart Cameron		Project Officer Coastal Weeds Project
Tim Gillespie-Jones	Forests NSW	Operations Forester

Monaro sub-region (22 August 2007 and/or 27 February 2008 at Cooma)

Howard Charles	Landholder	
Michael Michelmore	I&I NSW	Regional Weed Control Coordinator

Name	Organisation	Position
Don Clinton	Snowy River Shire Council	Vegetation Management Officer
Brett Jones	Cooma-Monaro Shire Council	Chief Weeds Officer
Marianne Anderson	Cooma-Monaro Shire Council	Senior Weeds Officer
Tim Fletcher	SRCMA	
Mark Robertson	SRCMA	CSO
Jim Darrant	Cooma-Monaro Shire Council	
Stuart Burge	Individual	Agronomist
Luke Pope	I&I NSW	
Julie Palmer	Snowy River Shire Council	
Brett Miners	SRCMA	
Luke McLachlan	DECCW	Pest Management Officer

Lower Shoalhaven sub-region (6 September 2007 and/or February 2008 at Nowra)

Amanda Mather	I&I NSW	Agronomist
Eric Zarrella	SRCMA	CSO
Greg Thompson	Shoalhaven City Council	
Ian Borrowdale	Shoalhaven City Council	Weeds Officer
Les Mitchell	DECCW	Project Officer
Libby Shields	DECCW	Ranger
Malcolm Whan	SLA/MRL/INCS?	
Michael Michelmore	I&I NSW	Regional Weed Control Coordinator
Mike Jarman	DECCW	Project Officer
Sandy Fritz	SRCMA	
Chris Presland	SRCMA	
Ian Jackett	DECCW	Pest Management Officer, South Coast Region
Grant Merinuk	LPMA	
Peter Pigott	SRCMA	
Alasdair Strutton	Shoalhaven City Council Landcare	

Upper Shoalhaven sub-region (4 September 2007 and/or February 2008 at Braidwood)

Rebecca Hall	SRCMA	Catchment Officer
David Hilhorst	SRCMA	Biodiversity Officer
Neville Plumb	Palerang Council	Environmental Officer (Weeds)
David Burns	DECCW	Ranger
Donna Hazell	SRCMA	Catchment Coordinator
Noel Perrin	LPMA	Land Administration Goulburn
Michael Michelmore	I&I NSW	Regional Weed Control Coordinator
Phil Shoemark	Upper Shoalhaven Landcare Council	
Tony Baxter	DECCW	
Frank Exon	SRCMA Braidwood	
Melinda Norton	DECCW	
Audrey Kutzner	DECCW	
Martin Royds	Upper Shoalhaven Landcare Council	
Ray Mooney	LPMA	Land Management Officer
Malcolm Ross	Goulburn Mulwaree Council	

Name	Organisation	Position
Illawarra sub-region (7 September 2007 and/or 5 February 2008 at Wollongong)		
Alycia Clifford	Shellharbour Council	Bush Regeneration Officer
Helen Wilson	Wollongong City Council	Bush Regeneration Officer
David Houghton	Shellharbour Council	Bush Regeneration Education Officer
David Curtis	SRCMA	Biodiversity Project Officer
David Pomery	Illawarra District Noxious Weeds Authority	Chief Weeds Officer
Peter Stuckey	Kiama Municipal Council	Manager Parks and Environment
Jacqueline Sedgewick	DECCW	Ranger Illawarra Area
Michael Michelmore	I&I NSW	Regional Weed Control Coordinator
Neil Rendell	SRCMA	
Jennifer Bean	DECCW	
Jedda Lemmon	Wollongong City Council	
Jen Byrne	Conservation Volunteers Australia	
Amanda Mather	I&I NSW	

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 K3.
PRIORITY WIDESPREAD WEEDS IMPACTING ON BIODIVERSITY FOR
EACH OF THE SIX SUB-REGIONS IN THE SOUTHERN RIVERS CMA REGION**

<i>Scientific name</i> (Common name)	<i>Scientific name</i> (Common name)
Bega	Upper Shoalhaven
<i>Acetosa sagittata</i> (turkey rhubarb)	<i>Cytisus scoparius</i> (Scotch broom)
<i>Anredera cordifolia</i> (Madeira vine)	<i>Eragrostis curvula</i> (African lovegrass)
<i>Araujia sericifera</i> (moth vine/mothplant)	<i>Nassella trichotoma</i> (serrated tussock)
<i>Asparagus asparagoides</i> (bridal creeper)	<i>Rubus fruticosus</i> agg. (blackberry)
<i>Conium maculatum</i> (hemlock)	Snowy
<i>Delairea odorata</i> (Cape ivy)	<i>Achillea millefolium</i> (yarrow)
<i>Ehrharta erecta</i> (panic veldtgrass)	<i>Eragrostis curvula</i> (African lovegrass)
<i>Eragrostis curvula</i> (African lovegrass)	<i>Hypericum perforatum</i> (St John's wort)
<i>Euphorbia paralias</i> (sea spurge)	<i>Nassella trichotoma</i> (serrated tussock)
<i>Lonicera japonica</i> (Japanese honeysuckle)	<i>Rubus fruticosus</i> agg. (blackberry)
<i>Nassella trichotoma</i> (serrated tussock)	<i>Salix</i> spp. (willows)
<i>Pennisetum clandestinum</i> (kikuyu)	Eurobodalla
<i>Polygala myrtifolia</i>	<i>Asparagus aethiopicus</i> (asparagus fern)
<i>Polygala virgata</i>	<i>Asparagus asparagoides</i> (bridal creeper)
<i>Populus</i> spp. (poplar)	<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)
<i>Rubus fruticosus</i> agg. (blackberry)	<i>Delairea odorata</i> (Cape ivy)
<i>Salix</i> spp. (willows)	<i>Ehrharta</i> sp. (veldtgrass)
<i>Senecio madagascariensis</i> (fireweed)	<i>Euphorbia paralias</i> (sea spurge)
<i>Tradescantia fluminensis</i> (trad)	<i>Juncus acutus</i> (spiny rush)
<i>Vinca major</i> (blue periwinkle)	<i>Lantana camara</i> (lantana)
Lower Shoalhaven	<i>Pennisetum clandestinum</i> (kikuyu)
<i>Acetosa sagittata</i> * (turkey rhubarb)	<i>Rubus fruticosus</i> agg. (blackberry)
<i>Ailanthus altissima</i> * (tree of heaven)	<i>Senecio madagascariensis</i> (fireweed)
<i>Anredera cordifolia</i> (Madeira vine)	Illawarra
<i>Araujia sericifera</i> (moth vine/mothplant)	<i>Acetosa sagittata</i> (turkey rhubarb)
<i>Asparagus aethiopicus</i> (asparagus fern)	<i>Ageratina adenophora</i> (crofton weed)
<i>Asparagus asparagoides</i> * (bridal creeper)	<i>Ageratina riparia</i> (mistflower)
<i>Bryophyllum delagoense</i> * (mother of millions)	<i>Anredera cordifolia</i> (Madeira vine)
<i>Caulerpa taxifolia</i> (caulerpa)	<i>Araujia sericifera</i> (moth vine/mothplant)
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)	<i>Arundo donax</i> (giant reed)
<i>Delairea odorata</i> * (Cape ivy)	<i>Asparagus</i> spp.
<i>Euphorbia paralias</i> (sea spurge)	<i>Chloris gayana</i> (Rhodes grass)
<i>Ipomoea</i> spp.* (morning glory)	<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)
<i>Juncus acutus</i> (spiny rush)	<i>Delairea odorata</i> (Cape ivy)
<i>Lagunaria patersonii</i> * (Norfolk Island hibiscus)	<i>Erythrina sykesii</i> (coral tree)
<i>Lantana camara</i> (lantana)	<i>Ipomoea</i> spp. (morning glory)
<i>Ligustrum lucidum</i> (large-leaf privet)	<i>Lantana camara</i> (lantana)
<i>Ligustrum sinense</i> (small-leaf privet)	<i>Ligustrum lucidum</i> (large-leaf privet)
<i>Lonicera japonica</i> * (Japanese honeysuckle)	<i>Ligustrum sinense</i> (small-leaf privet)
<i>Senna pendula</i> * (cassia/senna)	<i>Pennisetum clandestinum</i> (kikuyu)
	<i>Salix</i> spp. (willows)
	<i>Tradescantia fluminensis</i> (trad)

* added following consultation after the workshops.

APPENDIX K4.
ALL WEEDS CONSIDERED AT WORKSHOPS IN THE SRCMA REGION,
THEIR DISTRIBUTION AND THEIR RELATIVE IMPACT ON BIODIVERSITY

Scientific name (Common name)	Monaro		Eurobodalla		Bega		Illawarra		Lower Shoalhaven		Upper Shoalhaven	
	D ¹	I ²	D ¹	I ²	D ¹	I ²						
<i>Acacia baileyana</i> (Cootamundra wattle)									L	L		
<i>Acacia podalyrifolia</i> (Queensland silver wattle)									L	L		
<i>Acacia saligna</i> (golden wreath wattle)									L	L		
<i>Acetosa sagittata</i> (rambling dock, turkey rhubarb)	NP				W	H	W	M	W	M		L
<i>Acetosella vulgaris</i> (sorrel, sheep sorrel)							NP		L	L	W	L
<i>Achillea millefolium</i> (yarrow)	W	H					NP					L
<i>Agapanthus</i> spp. (agapanthus)			L				L	L	E	L		
<i>Agave americana</i> (agave cactus, century plant)	NP		NP		L		L	L				L
<i>Ageratina adenophora</i> (crofton weed)	NP				E	L	W	H	W	L		L
<i>Ageratina riparia</i> (mistflower, creeping crofton weed)	NP		NP		NP		W	H	W	M		L
<i>Ageratum houstonianum</i>							NP					L
<i>Ailanthus altissima</i> (tree of heaven)	E	L	L		L		L	L	L	L	W	M
<i>Alternanthera philoxeroides</i> (alligator weed)	NP				NP		A	L	A	L		L
<i>Ambrosia artemisiifolia</i> (annual ragweed)							NP					L
<i>Ambrosia psilostachya</i> (perennial ragweed)							NP		?			L
<i>Ammophila arenaria</i> (marram grass)							W	L	W	L		L
<i>Anagallis arvensis</i> (scarlet pimpernel, blue pimpernel)							L	L	L	L		L
<i>Andropogon virginicus</i> (whiskey grass, broom sedge)			L				W	L	W	L		L
<i>Anredera cordifolia</i> (Madeira vine, lamb's tail, jalap, potato vine)	NP		W	H	W	H	W	H	W	H		L
<i>Anthoxanthum odoratum</i> (sweet vernal grass)							NP		W	L	W	L
<i>Araujia sericifera</i> (moth vine, mothplant)	NP		E		W	H	W	H	W	L		L
<i>Arctotheca calendula</i> (Capeweed, Cape dandelion)	W	L	W	L	E		L	L	W	L	W	L
<i>Arctotheca populifolia</i> (beach daisy)							?		W	L		L
<i>Artemisia verlotiorum</i> (Chinese wormwood, mugwort)							NP		NP			L
<i>Arundo donax</i> (giant reed)							W	H				
<i>Asparagus aethiopicus</i> (asparagus fern, sprengeri fern)			W	H			W	H	W	H		L
<i>Asparagus africanus</i> (climbing asparagus)									W	L		
<i>Asparagus asparagoides</i> (bridal creeper, florist's smilax)	NP		W	H	W	H	W	H	E	L		L
<i>Asparagus scandens</i> (asparagus fern)							W	H				L
<i>Aster subulatus</i> (wild aster, bushy starwort, aster weed)							L	L	NP			L
<i>Avena sativa</i> (oats)							NP.		NP			L
<i>Axonopus fissifolius</i> (narrow-leaved carpet grass)							NP		W	L		L

Scientific name (Common name)	Monaro		Eurobodalla		Bega		Illawarra		Lower Shoalhaven		Upper Shoalhaven	
	D ¹	I ²	D ¹	I ²	D ¹	I ²						
<i>Baccharis halimifolia</i> (groundsel bush)	NP		NP		A		E	L	L	L		L
<i>Barbarea verna</i> (wintercress, American cress)							NP		NP			L
<i>Batrachium trichophyllum</i>							?		NP			
<i>Bidens pilosa</i> (cobble's pegs)											W	
<i>Billardiera heterophyla</i>					E	L						
<i>Bryophyllum delagoense</i> (mother of millions)	NP		E		L	L	L	L	W	M		L
<i>Cabomba caroliniana</i> (cabomba, fanwort)							A		A			L
<i>Caesalpinia decapetala</i> (thorny poinciana, wait-a-while, mysore thorn)							E	L	NP			L
<i>Cardiospermum grandiflorum</i> (balloon vine)							L	L	L	L		L
<i>Carduus nutans</i> (nodding thistle)	W	M	E		E		NP		L	L	L	L
<i>Carduus pycnocephalus</i> (slender thistle)							NP		NP		L	L
<i>Carduus tenuiflorus</i> (winged slender thistle)							NP		NP		L	L
<i>Caulerpa taxifolia</i> (caulerpa)					E	L	A		W	H		L
<i>Celtis occidentalis</i> (hack berry)							L	L				
<i>Cenchrus incertus</i> (spiny burr grass)	NP		NP		NP		A		NP		A	
<i>Cenchrus longispinus</i> (innocent weed, spiny burrgrass)									NP			L
<i>Cestrum parqui</i> (green cestrum, green poisonberry)							W	L	L	L		L
<i>Chloris gayana</i> (Rhodes grass)							W	H				
<i>Chlorophytum comosum</i> (spiderplant)			L									
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i> (boneseed)	NP		E		E		E	L	E	L	A	L
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)	NP		W	H	E	L	W	H	W	H		L
<i>Cinnamomum camphora</i> (camphor laurel)					L	L	L	L	L	L		
<i>Cirsium arvense</i> (perennial thistle)	L						NP		NP			L
<i>Cirsium vulgare</i> (spear, black, Scotch thistle)	W	L	W		W	L	W	L	W	L	W	L
<i>Conium maculatum</i> (hemlock)	L	L	L		W	L?	L	L	NP		W	L
<i>Conyza</i> sp. (fleabane)			W	M								
<i>Coprosma repens</i> (mirror bush)			E						L	L		
<i>Cordyline congesta</i>			NP									
<i>Coreopsis lanceolata</i> (coreopsis, tickseed)			A									
<i>Cortaderia selloana</i> (pampas grass)	E	L	L		L	L	L	L	L	L		L
<i>Cotoneaster glaucophyllus</i>	E	L			L		L	L	L	L		L
<i>Crassula multicava</i>			L									
<i>Crataegus monogyna</i> (hawthorn)							L	L	L	L	W	L
<i>Crococsmia x crocosmiflora</i> (montbretia)									W	L		
<i>Cucumis myriocarpus</i> (prickly paddy melon)											L	L
<i>Cuscuta campestris</i> (golden dodder)									NP			L
<i>Cuscuta</i> spp. (dodder)							NP		NP			L
<i>Cynodon dactylon</i> (couch grass)	A											

Scientific name (Common name)	Monaro		Eurobodalla		Bega		Illawarra		Lower Shoalhaven		Upper Shoalhaven	
	D ¹	I ²	D ¹	I ²	D ¹	I ²						
<i>Cytisus scoparius</i> (Scotch broom, broom, English broom)	L		E		A		NP		E	L	W	H
<i>Datura</i> spp.											L	L
<i>Delairea odorata</i> (Cape ivy)	NP		W	H	W	H	W	H	W	L		L
<i>Dietes</i>									E	L		
<i>Dipogon lignosus</i> (dolichos pea)					E	L	L	L	L	L		L
<i>Echium plantagineum</i> (Paterson's curse)	W	L	E		L		L	L	L	L	W	L
<i>Echium vulgare</i> (vipers bugloss)	W	L					L	L	A			L
<i>Ehrharta erecta</i> (panic veldtgrass)			W	H	W	M?			W	L		
<i>Eichhornia crassipes</i> (water hyacinth)	NP		A		A		E	L	L	L		L
<i>Eragrostis curvula</i> (African lovegrass)	W	H	E		W	H	W	L	E	L	W	H
<i>Erythrina sykesii</i> (coral tree)	NP		L		S		W	H	W	L		L
<i>Euphorbia</i> (capers spurge)											E	
<i>Euphorbia paralias</i> (sea spurge)	NP		W	H	W	H	A		E	L		L
<i>Genista monspessulana</i> (Montpellier broom, French broom)			E		L	L	W	L	L	L	A	L
<i>Gomphocarpus fruticosus</i> (narrow leaved cottonbush)									L	L		
<i>Grevillia robusta</i>									L	L		
<i>Hedera helix</i> (English ivy)							L	L	W	L		L
<i>Hedychium gardnerianum</i> (wild ginger)							W	M	L	L		
<i>Heliotropium amplexicaule</i> (blue heliotrope)							NP		NP		L	L
<i>Hyparrhenia hirta</i> (Coolatai grass)			A									
<i>Hypericum perforatum</i> (St John's wort)	W	H	E		E		E	L	L	L	W	L
<i>Hypochaeris radicata</i> (catsear)			W	L								
<i>Impatiens balsamina</i> (impatience)			L									
<i>Ipomoea cairica</i> (coastal morning glory, mile a minute)							W	H	W	L		L
<i>Ipomoea</i> sp. (morning glory)	NP				L	L	W	H	W	L		L
<i>Juncus acutus</i> (spiny rush, spike rush, sharp rush)			W	H			NP		W	H		L
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i> (Norfolk Island hibiscus)									L	L		
<i>Lantana camara</i> (lantana)	NP		W	H	E	L	W	H	W	H		L
<i>Lantana montevidensis</i> (creeping lantana, trailing lantana)							E	L	A			L
<i>Ligustrum lucidum</i> (large-leaf privet)							W	H	W	H		L
<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)	E	L	E		E	L	W	H	W	H	L	L
<i>Ligustrum</i> spp. (privets)	E	L	E		L	L	W	H				
<i>Lilium formosanum</i> (Formosa lily)									W	L		
<i>Lonicera japonica</i> (Japanese honeysuckle)			E		W	H	W	M	W	L		L
<i>Ludwigia peruviana</i> (ludwigia, Peruvian water primrose)	NP		A		NP		A		A			L
<i>Lycium ferocissimum</i> (African boxthorn)	L	L	L		L		L	L	L	L	E	L
<i>Macfadyena unguis-cati</i> (cat's claw creeper)	NP		A		S		E	L	L	L		L
<i>Mandevilla laxa</i> (Chilean jasmine)									E	L		

Scientific name (Common name)	Monaro		Eurobodalla		Bega		Illawarra		Lower Shoalhaven		Upper Shoalhaven	
	D ¹	I ²	D ¹	I ²	D ¹	I ²						
<i>Marrubium vulgare</i> ((white) horehound)	W	L			L		L	L	L	L	L	L
<i>Moraea collina</i> (Cape tulip)			L									
<i>Myriophyllum aquaticum</i> (parrot's feather)					E	L	E	L				
<i>Nassella neesiana</i> (Chilean needle grass)	E	H	A				E	L	A		E	L
<i>Nassella trichotoma</i> (serrated tussock, Yass tussock)	W	H	E		W	H	L	L	E	L	W	H
<i>Nephrolepis cordifolia</i> (fishbone fern)									L	L		
<i>Ochna serrulata</i> (ochna)							W	M	L	L		
<i>Olea europaea</i> subsp. <i>cuspidata</i> (common olive, African olive)	NP		L		E		E	L	L	L		L
<i>Onopordum acanthium</i> (Scotch thistle)							NP		L	L		L
<i>Onopordum acaulon</i> (stemless thistle)							NP		NP		W	L
<i>Onopordum illyricum</i> (Illyrian thistle)							NP		NP			L
<i>Onopordum</i> spp. (thistles)	W	L	E		E							
<i>Opuntia</i> spp. (prickly pears)	NP		L		L		L	L	L	L	W	L
<i>Osteospermum ecklonis</i>			E		E	L						
<i>Oxalis</i> spp.									W	L		
<i>Paspalum dilatatum</i> (paspalum)	W	L	W	M	W	M	W	L	W	L		L
<i>Passiflora</i> spp. (common passionfruit, black passionfruit)	NP		L		L		L	L	W	L		L
<i>Pennisetum clandestinum</i> (kikuyu)	NP		W	H	W	H	W	H	W	L		L
<i>Pennisetum macrourum</i> (African feather grass)							NP		NP			L
<i>Pennisetum villosum</i> (feathertop, white foxtail, long style feather grass)	E	L			L		E	L	A			L
<i>Phoenix canariensis</i> (phoenix palm)							L	L				
<i>Phyllostachys aurea</i> (bamboo)							E	L				
<i>Phytolacca octandra</i> (inkweed)	NP		W	L	W	L	W	L	W	L		L
<i>Pinus radiata</i> (radiata pine, monterey pine)	L	L			E	L	L	L	W	L	E	L
<i>Polygala myrtifolia</i> (myrtleleaf milkwort)	NP		A		W	H	L	L	L	L		L
<i>Polygala virgata</i>					W	H						
<i>Populus</i> sp. (poplar)					W	L?						
<i>Psoralea pinnata</i>			L									
<i>Pyracantha</i> spp. (firethorn)			L		L		L	L	NP			L
<i>Raphanus raphanistrum</i> (wild radish, jointed charlock)							NP		NP			L
<i>Rhamnus alaternus</i> (buckthorn)											E	
<i>Ricinus communis</i> (castor oil)	L	L	A				W	L	W	L		L
<i>Robinia pseudoacacia</i>							L	L				
<i>Romulea rosea</i> var. <i>australis</i> (onion grass)									L	L		
<i>Rosa rubiginosa</i> (sweet briar, briar rose, eglantine)	W	M			L		L	L	L	L	W	L
<i>Rubus fruticosus</i> agg. (blackberry)	W	H	W	H	W	H	W	M	W	H	W	H
<i>Sagittaria platyphylla</i> (sagittaria (prev. <i>S. graminea</i>))			A									
<i>Salix</i> spp. (willows)	W	H	E		W	H	W	H	L	L		L
<i>Salvinia molesta</i> (salvinia)	NP		E		A		E	L	E	L		L

Scientific name (Common name)	Monaro		Eurobodalla		Bega		Illawarra		Lower Shoalhaven		Upper Shoalhaven	
	D ¹	I ²	D ¹	I ²	D ¹	I ²						
<i>Senecio angulatus</i> (creeping groundsel)			E		E	L			L	L		
<i>Senecio madagascariensis</i> (fireweed)	E	H	W	H	W	H	W	L	W	H	A	L
<i>Senna pendula</i> (cassia, senna (smooth))	NP				L		W	M	W	M		L
<i>Senna septemtrionalis</i> (arsenic bush, senna (winter))							NP?		W	M		L
<i>Solanum laxum</i> (potato climber, jasmine nightshade)	NP		NP		NP		NP		E	L		L
<i>Solanum mauritianum</i> (wild tobacco plant, nightshade)	L		W	M	A		W	L	W	L	L	L
<i>Solanum nigrum</i> (blackberry nightshade)			W	L			W	L	W	L		
<i>Solanum pseudocapsicum</i>							L	L	W	L		
<i>Sonchus oleraceus</i> (common sowthistle)							W	L	W	L		L
<i>Spartium junceum</i> (Spanish broom)							NP		NP			L
<i>Sporobolus fertilis</i> (giant Parramatta grass)	NP		E		E		E	L	W	H		L
<i>Stenotaphrum secundatum</i> (buffalo grass)			L	M					W	L		
<i>Tagetes minuta</i> (stinking roger)	L		W	L	W	L	L	L	W	L		L
<i>Thunbergia alata</i> (black-eyed Susan vine)			L									
<i>Toxicodendron succedaneum</i> (rhus tree)							L	L	E	L		L
<i>Tradescantia fluminensis</i> (trad)	NP		E		W	H	W	H	W	L		L
<i>Typha</i> sp. (cumbungi)	E	L							NP			L
<i>Ulex europaeus</i> (gorse, furze)			A				E	L	E	L	A	L
<i>Verbascum blattaria</i> (moth mullein)	E						NP		NP			L
<i>Verbascum thapsus</i> (blanket weed, great mullein, Aaron's rod)	W	L	L		E		NP		NP		W	L
<i>Verbascum virgatum</i> (twiggy mullein, green mullein)	W	L	L				NP		NP		W	L
<i>Vinca major</i> (blue periwinkle, greater periwinkle)	W	M			W	H	E	L	L	L		L
<i>Watsonia meriana</i> (watsonia)									W	L		
<i>Xanthium occidentale</i> (noogoora burr, cockle burr)									L	L		L
<i>Xanthium orientale</i> (Californian burr)									NP			L
<i>Xanthium spinosum</i> (Bathurst burr)									L	L		L
<i>Xanthium</i> spp. (Noogoora burr, cockle, Bathurst burr)	E	L			L	PO	L	L				
<i>Yucca filamentosa</i> (yucca)			L									
<i>Zantedeschia aethiopica</i> (arum lily, pig lily, calla lily)	NP				L	L	W	M	W	M		L

¹Distribution (D) abbreviations: W = widespread; L = localised; E = emerging; A = alert; NP = not present; ? = unsure.

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

Blank cells represent a lack of knowledge about a species' distribution or impact at workshops.

**APPENDIX K5.
TEMPLATE OF LETTER SENT TO PRIVATE LANDHOLDERS WITH
VOLUNTARY CONSERVATION AGREEMENTS OR WILDLIFE REFUGES
ON THEIR PROPERTIES**

11 April 2008

Address

Dear Sir or Madam,

Did you know that weeds are one of the biggest threats to our native plants and animals in Australia?

Our colleagues in the Pest Management Unit are currently running a project to identify priority weeds that are threatening biodiversity across all land tenures. At a series of workshops held last year, a list of high priority widespread weeds impacting on biodiversity for each of the six sub-regions within the Southern Rivers catchment was established (see overleaf and attached map).

The project is now identifying the location of these priority weeds within the catchment. This information will be collated into a database and will help direct investment in weed control for biodiversity conservation. Funding for weed control for priority sites is available through the project.

Being landholders with biodiversity of high conservation value, you are invited to take part in the project. If one or more of the weeds listed below are threatening biodiversity on your land you are eligible to **nominate a site, or a number of sites** on your property and potentially receive funding for weed control.

All you need to do is complete the attached site nomination form and return it by **Friday 9 May**. Information from site nominations, as well as existing biodiversity knowledge within the region, will be used to rank sites for weed control funding. If you wish to be considered for the weed control aspect of the project and the funding assistance, please indicate if, as a landholder in the Conservation Partners Program, you have previously received funding for weed control on your property and details of the scope of the work undertaken.

Please complete the form to the best of your knowledge using the attached instructions. Please also complete and return the data use agreement. If you are unsure of how to address any of the fields then indicate 'Further Information Required'. If you have any questions about how to nominate a site or fill in the form, wish to receive an electronic copy of the forms to complete or require more information, contact the project officer on 9585 6837 or weeds.cma@environment.nsw.gov.au.

You can also find out more about the project by visiting:

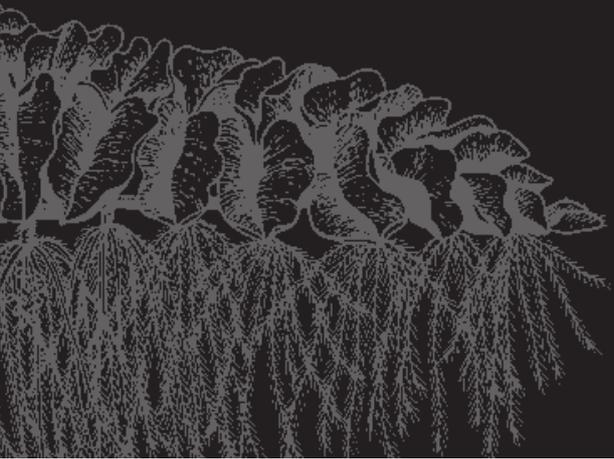
www.environment.nsw.gov.au/cmaweeds

Yours sincerely

Sally Ash

Conservation Partners Program Coordinator

Parks and Wildlife Group



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