



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

Hawkesbury–Nepean CMA region

Part C

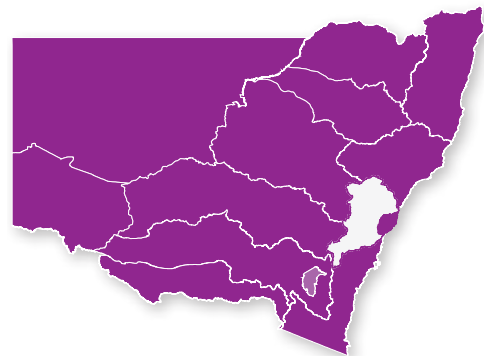


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C1. INTRODUCTION

This is one of the 13 regional documents that sit under the *Biodiversity priorities for widespread weeds – statewide framework*. It provides information for the Hawkesbury-Nepean Catchment Management Authority (HNCMA) 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 C) establishes regional priorities, in the form of priority widespread weeds and priority sites for control, in the HNCMA region.

The Hawkesbury-Nepean (HN) CMA region covers 21,400 square kilometres with landscapes ranging from rainforests to open woodlands, to grasslands and wetlands (HNCMA 2006). Almost one million people live in the region and much of the landscape has been altered dramatically for development and agriculture. Despite this, almost half of the region is protected in over 10,000 square kilometres of national parks and reserves and is the exclusive home to much of Australia's diverse native fauna and flora, with biodiversity recognised as nationally and internationally significant (HNCMA 2006).

Invasive plants and animals are recognised as a key threat to the sustainability of the region's natural resources in the HN Catchment Action Plan (CAP) along with pressures posed by land clearing, fire, pollution, climate change, groundwater extraction and altered flow regimes (HNCMA 2006). 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)), using collated information from recovery plans, key threatening process (KTP) listings and the Priorities Action Statement (PAS), found that 98 weed species in the HNCMA region were threatening biodiversity, including 99 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 HNCMA 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 HNCMA 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 HNCMA to measure progress towards relevant targets, including the Natural Resource Commission (NRC) target for invasive species (NRC 2005) and Catchment Action Plan (CAP) targets.

Additional funds provided in 2007/08 by HNCMA enabled the project to be expanded in the HNCMA region to include:

- » a stakeholder survey of current weed management activities in the region
- » additional workshops with expert stakeholders in the region
- » mapping of nominated sites and spatial analysis with known HNCMA priority areas and current HNCMA weed activities.

C2. REGIONAL CONTEXT

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

C2.1 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 co-ordinated plan for natural resource work in the region over a 10-year period. The HNCMA CAP outlines resource condition targets under four themes: (i) community and partnerships, (ii) river health, (iii) biodiversity and (iv) soil and land. A series of management targets for each resource condition target illustrate how the CMA will invest in and measure progress towards natural resource management (HNCMA 2006).

By identifying and prioritising biodiversity at risk from weeds in the HNCMA region, as well as identifying priority sites for control, this project will help HNCMA address four key management targets in the HN CAP (Table C1). These management targets sit under three broader biodiversity condition targets for (i) threatened species (target - B3), (ii) invasive species (B4) and (iii) conditions favouring invasive species (B5) (Table C1).

Table C1. Specific management targets in the HNCMA CAP relevant to the outcomes of this project.

Management target	Aim	Performance indicator(s)
<p>Resource condition target (Biodiversity) B3 – Threatened species</p> <p>Aim: By 2016, actions have been undertaken, according to their level of urgency, that assist in the conservation of threatened species by implementing: (A) for terrestrial species – the actions identified in the PAS under preparation by the DECC, (B) for aquatic species – the actions in the recovery plans prepared under the <i>NSW Fisheries Management Act 1994</i> or the <i>Environment Protection and Biodiversity Conservation Act 1999</i>.</p> <p>By 2016, there is an increase in:</p> <ul style="list-style-type: none"> » the area of endangered ecological communities that is protected under management agreements and/or » the area of suitable habitat for threatened species that are protected under management agreements. 		
B3-1 Threatening process management	By 2016, activities classified as 'threatening processes' are identified and included in HNCMA management plans and agreements with landholders and other partners	<ul style="list-style-type: none"> (i) number of landholder management agreements that recognise threatening processes; (ii) number of partner project service agreements that include action to manage threatening processes; (iii) number of internal projects that include action to manage threatening processes, and; (iv) area (ha) of habitat management.

Management target	Aim	Performance indicator(s)
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Resource condition target (Biodiversity) B4 - Invasive species

Aim: By 2016 there is a reduction in the negative impact of invasive species on both biodiversity and sustainable primary production in terrestrial and aquatic ecosystems,

B4-1 Weed control	By 2016, there has been a 5% reduction in coverage of target weeds identified in the HN Weed Strategy (DPI 2007) through primary weed control measures and effective processes are in place to eradicate new weed outbreaks and emerging weed threats	(i) area (ha) of pest plant control; (ii) funding allocated to weed control for area of pest plant control.
B4-2 Maintenance of weed control	By 2016, 50% of areas treated for invasive plant control (under projects supported by HNCMA since 2006/7 report sustained success)	(i) change in area/spread of target weed species identified in the Catchment Weed Strategy (through mapping, monitoring and viewing of aerial photographs), and (ii) ongoing spending required in specific areas reduced over time.

Resource condition target (Biodiversity) B5 - Conditions favouring invasive species

Aim: By 2016, there is a reduction in the conditions which favour invasive species primarily through improvement in ecosystems as indicated by: (1) for terrestrial ecosystems: an increase in native vegetation, maintenance of groundcover, reduction in erosion and land degradation, use of current recommended practice, and (2) for aquatic ecosystems: an increase in native riparian vegetation, diversity of in-stream habitat, a reduction in sediment loads, a reduction in nutrient loads, a reduction in streambank degradation (erosion),

B5-1 Action to reduce conditions that favour invasive species	By 2016, management actions to reduce the conditions that favour invasive species have been implemented	(i) area (ha) of pest plant control
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C2.2 Hawkesbury Nepean Catchment Weed Management Strategy

The HN Catchment Weed Management Strategy (DPI 2007) was developed in consultation with members of the regional weed committees (see Section 2.3) and the community via interviews and workshops, held at Richmond, Camden, Moss Vale, Lithgow and Ku-ring-gai Chase National Park, from September 2005 to May 2006. Priority lists of weeds of regional significance were developed for each sub-region within the HNCMA, using Randall's weed prioritisation process (Randall 2000). Because the resulting lists of weeds favoured new and emerging species, additional widespread weeds were included in the lists through group consensus.

The goals and objectives of the HN Catchment Weed Management Strategy are aligned with the Australian Weeds Strategy (NRMMC 2007). This project compliments the HN Catchment Weed Management Strategy by directly addressing parts of the actions outlined below by identifying priority areas/sites for weed control, considering not only the biodiversity value of the site (including, but not limited to endangered species and communities), but also the likelihood of achieving effective control and a positive biodiversity response. It will also address the impact of widespread weeds present in the HNCMA region on biodiversity.

This project is relevant to the following goals of the HN Catchment Weed Management Strategy:

Goal 2: Reduce the impact of existing priority weed problems

2.1.iii - Priority areas for control identified and inspections of the short list weeds conducted (short list put together by HNCMA and weeds committees).

Action: Identify priority areas, with consideration given to: (i) isolated and small infestations, (ii) top of catchments and (iii) endangered species and ecological communities (using PAS).

2.3.i – Weeds are managed to protect the biodiversity and conservation needs of bushland, especially threatened or endangered species/communities.

Actions: (i) review Priorities Action Statements (PAS), threat abatement plans (TAP) and recovery plans to identify priority actions and sites for specific endangered species and communities and (ii) target weed management in bushland areas focusing on: (1) species posing the greatest controllable threat to quality of bushland; (2) strategic areas where control is most effective in achieving sustainable outcomes; (3) maintaining integrity/viability of remnants, and; (4) the consolidation of gains made from previous efforts.

C2.3 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. 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 committees relevant to the HNCMA region include (note, their boundaries do not align with those of the CMA):

- » Southern Tablelands and South Coast Noxious Plants Committee
- » Sydney Weeds Committee (formerly Sydney North Regional Weed and Sydney West Blue Mountains Regional Weed Committees)
- » Upper Hunter Noxious Plants Advisory Committee

C2.4 Office of Environment & Heritage (OEH) regional pest management strategies

Within the HNCMA region the NPWS (now 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, there are six strategies relevant to the HN region: (i) Blue Mountains, (ii) South Coast, (iii) Sydney South, (iv) Sydney, (v) Sydney North, and (vi) Central Coast Hunter Ranges (see www.environment.nsw.gov.au/pestsweeds/RegionPestManagement.htm). At the time of the HNCMA workshops (February 2008 – see Section C3.1.1) only the Blue Mountains RPMS was available, thus only weed priorities from this strategy were incorporated into the weeds list considered at workshops.

During 2009/10, NPWS undertook a comprehensive survey of NPWS estate to establish biodiversity priorities for widespread weeds. Relevant priorities from these surveys are incorporated into this project (see Section 1.6.1 of the *statewide framework*).

C2.5 Priorities Action Statement (PAS)

In accordance with the TSC Act, the 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 69 actions in the PAS relevant to weed management in the HNCMA region (Appendix C1). Of these, eight are associated with implementation of the Bitou Bush threat abatement plan (TAP) (DEC 2006), 34 are generic, recommending targeted bush regeneration or general weed management, with the remaining 27 directing weed control 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.

C2.6 Threatened Species Prioritisation and Implementation Strategy for the Priorities Action Statement

The Threatened Species Prioritisation and Implementation Strategy for the Priorities Action Statement (DECC 2008) was developed for the Metropolitan Branch of Department of Environment, Climate Change and Water (DECCW – now known as OEH). It recognised that all actions in the PAS database can never be fully implemented due to resource and logistical constraints, and as such has identified the species, communities, populations and key threats that should receive focused attention as a priority. It utilised the PAS actions to identify 23 programs ranging from broad-scale, multi-species programs to single species recovery programs. Of particular importance to HNCMA is the program targeting 'Priority conservation areas and endemic flora of the Cumberland Plain'. Identification of these priority areas included consideration of size, shape, condition and the landscape context of individual remnants, as well as the presence of threatened species.

C2.7 Terrestrial Vertebrate Fauna of the Greater Southern Sydney Region

The Terrestrial Vertebrate Fauna of the Greater Southern Sydney Region report (DECC 2007) identifies four priority habitats for threatened fauna species, being: (i) Grassy Box Woodlands, (ii) Upland Swamps, (iii) Alluvial Forests and Woodlands and (iv) Coastal Wetlands, as well as major fauna corridors and linkages which will aid the long-term survival of nomadic and migratory species and animals with large home ranges in the region. The Terrestrial Vertebrate Fauna of the Greater Southern Sydney Region identification process was later expanded to incorporate the entire Hawkesbury-Nepean CMA region (see Appendix C5 for descriptions of priority habitats and corridors and a map indicating their locations within the HNCMA region).

This project incorporates the priority habitats and corridors for threatened fauna identified in the Terrestrial Vertebrate Fauna of the Greater Southern Sydney Region report in the assessment of the impact of the high priority weeds (Section C3.2.2, Stage 2).

C3. REGIONAL OUTPUTS

C3.1 Methodology used to develop the priorities

The *statewide framework* outlines the broad methods applied across the 13 CMAs 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, being:

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 HNCMA 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*.

C3.1.1 Workshops in the HNCMA region

Four workshops were held in the HNCMA region at Windsor, Katoomba, Picton and Goulburn on 12, 13, 20 and 21 February 2008, respectively. An additional meeting was held in Lithgow on the 15 April as this area of the region was not represented well at the earlier workshops. The five workshops were attended by a total of 58 people representing government departments, local councils, community organisations, private companies and private land owners (see Appendix C2 for a full list of workshop attendees).

C3.1.2 HNCMA 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 HNCMA region including: workshop details, outcomes from workshops, the site nomination form and instructions, and a project contact (www.environment.nsw.gov.au/cmaweeds/HawkesburyNepean.htm).

C3.2 The process

C3.2.1 Stage 1. Identifying weeds that pose a threat in the HNCMA region

Weeds dataset for the HNCMA 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*, the sources listed in Section C2, and the following regionally important reports and strategies:

- » Wollondilly Shire Weed Management Strategy (draft)
- » Wollondilly Biodiversity Strategy
- » Wingecarribee Shire Council Class 4 Weed Strategy
- » Weeds of the Sydney West Region
- » Environmental Weeds of the Southern Highlands
- » Native Vegetation Management – Hawkesbury–Nepean
- » Common Riverbank Weeds of the Hawkesbury
- » Penrith Biodiversity Strategy
- » Goulburn Biodiversity Strategy

Distribution of weeds within the HNCMA region

The weeds dataset for the HNCMA region was presented to workshop participants, who were asked to identify the current distribution of each of weed species in the HNCMA region according to the categories outlined in Table C2. The distribution for each weed considered, plus weeds added by participants, is provided in Appendix C3.

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 C3). A total of 46 widespread weeds were identified as having a high impact on biodiversity at two or more of the workshops. The identified species were compiled into a final list of priority widespread weeds in the region (Table C4). An additional 44 widespread weeds were identified as having a high impact on biodiversity in specific areas (Appendix C4).

Table C2. Definitions of spatial weed distribution categories, as used in stakeholder workshops.

Category	Weed distribution definition
Widespread*	Species that have established well in the landscape and are close to reaching their maximum potential distribution in the 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 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.

Table C3. Definitions of the level of impact of weed species on biodiversity as used in stakeholder evaluations.

Category	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 C4. Priority widespread weeds impacting on biodiversity in the HNCMA region (listed in alphabetical order).

Scientific name (Common name)	KTP ¹	WoNS ²	CMA priority ³	Noxious	
				NSW ⁴	LGA ⁵
<i>Acer negundo</i> (box-elder maple)			Y		
<i>Ageratina adenophora</i> (crofton weed)	Y*		Y		Y
<i>Ageratina riparia</i> (mistflower, creeping crofton weed)	Y*				Y
<i>Ailanthus altissima</i> (tree of heaven)	Y*		Y		Y
<i>Alternanthera philoxeroides</i> (alligator weed)		Y	Y		Y
<i>Anredera cordifolia</i> (Madeira vine, lamb's tail)			Y		Y
<i>Arundo donax</i> (Spanish reed, giant reed)			Y		Y
<i>Asparagus asparagoides</i> (bridal creeper, florist's smilax)	Y	Y	Y	5	
<i>Bryophyllum delagoense</i> (mother of millions)	Y		Y		Y
<i>Cardiospermum grandiflorum</i> (balloon vine)	Y		Y		Y
<i>Cestrum parqui</i> (green cestrum, green poisonberry)	Y*		Y		Y
<i>Chloris gayana</i> (Rhodes grass)	Y				
<i>Crataegus monogyna</i> (hawthorn)	Y*		Y		
<i>Crocoshia x crocosmiiflora</i> (montbretia)	Y*		Y		Y
<i>Cyperus eragrostis</i> (umbrella sedge)			Y		
<i>Delairea odorata</i> (Cape ivy)	Y		Y		Y
<i>Echium plantagineum</i> (Paterson's curse)	Y*		Y		Y
<i>Eichhornia crassipes</i> (water hyacinth)					Y
<i>Eragrostis curvula</i> (African lovegrass)	Y		Y		Y
<i>Genista monspessulana</i> (Montpellier broom, French broom)			Y		
<i>Gleditsia triacanthos</i> (honey locust)	Y*		Y		
<i>Ipomoea indica</i> (blue morning glory, purple morning glory)	Y		Y		Y
<i>Ipomoea purpurea</i> (common morning glory)	Y				
<i>Juncus acutus</i> (spiny rush, spike rush)					
<i>Juncus articulatus</i> (joint rush)					
<i>Lantana camara</i> (lantana)	Y	Y	Y	5	Y

Scientific name (Common name)	KTP ¹	WoNS ²	CMA priority ³	Noxious	
				NSW ⁴	LGA ⁵
<i>Ligustrum lucidum</i> (broad-leaf privet)	Y*		Y		Y
<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)	Y*		Y		Y
<i>Lonicera japonica</i> (Japanese honeysuckle)	Y		Y		
<i>Ludwigia peruviana</i> (ludwigia, Peruvian water primrose)			Y		Y
<i>Lycium ferocissimum</i> (African boxthorn)	Y*		Y		Y
<i>Nassella neesiana</i> (Chilean needle grass)	Y	Y	Y		Y
<i>Nassella trichotoma</i> (serrated tussock, Yass tussock)	Y	Y	Y		Y
<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)	Y*		Y		
<i>Opuntia</i> spp. (prickly pear, tiger pear)			Y	4	
<i>Paspalum dilatatum</i> (paspalum)					
<i>Phyllostachys aurea</i> (rhizomatous bamboo)			Y		Y
<i>Populus alba</i> (white poplar)			Y		
<i>Ranunculus repens</i> (creeping buttercup)			Y		
<i>Ricinus communis</i> (castor oil)			Y		Y
<i>Rubus fruticosus</i> agg. (blackberry)	Y*	Y	Y	4	
<i>Salix</i> spp. (willow)	Y*	Y	Y	5	
<i>Salvinia molesta</i> (salvinia)		Y	Y		Y
<i>Tradescantia fluminensis</i> (trad)	Y		Y		Y
<i>Ulex europaeus</i> (gorse, furze)	Y*	Y	Y		Y
<i>Vinca major</i> (blue periwinkle, greater periwinkle)	Y*		Y		

KTP¹ = Weed listed under a key threatening process in the TSC Act; WoNS² = Weeds of National Significance (Thorpe and Lynch 2000); CMA priority³ = weed listed as a priority in the HN Catchment Weed Management Strategy (DPI 2007); NSW⁴ = All of New South Wales; LGA⁵ = 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*.

C3.2.2 Stage 2. Identifying biodiversity at risk from high priority weeds

At each workshop, participants were provided with lists of (i) endangered ecological communities (EECs) and threatened fauna and flora (as listed under the TSC Act), (ii) priority habitats and corridors for threatened fauna (see Appendix C5), (iii) nationally significant wetlands, and (iv) general vegetation types present in the HNCMA 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 revised final list identifies EECs, vegetation communities, threatened species, habitats, corridors and wetlands that are considered under threat from the high priority weeds (Tables C5, C6, C7 and C8). This information was used to help guide site nominations (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

The EEC threatened by the greatest number of high priority weeds was River Flat Eucalypt Forest on Coastal Floodplains (38 high priority weeds), followed by Shale Sandstone Transition Forest (32 high priority weeds), Castlereagh Swamp Woodland Community (24 high priority weeds) and Sydney Turpentine Ironbark Forest in the Sydney Basin Bioregion (24 high priority weeds). The weed species posing the greatest threat in terms of number of EECs threatened were *Rubus fruticosus* agg. (25 EECs), followed by *Ligustrum sinense* (20 EECs), *Tradescantia fluminensis* (18 EECs) and *Ligustrum lucidum* (17 EECs).

Impact of widespread weeds on threatened plants and animals

Twenty-eight threatened native flora (Table C6) and 21 native fauna species (Table C7) were identified as being at risk from one or more high priority weeds in the HNCMA region. For native flora species, *Eucalyptus benthamii* had the highest number of high priority weed threats (17 species), followed by *Pomaderris brunnea* (12 species) and *Microstrobos fitzgeraldii* (10 species). For native fauna species the giant dragonfly had the greatest number of high priority weed threats (22 species) followed by the Blue Mountains water skink (20 species) and the Cumberland land snail (10 species).

The weed species posing the greatest threat in terms of number of native plant species threatened were *Eragrostis curvula* (eight native plants) and *Rubus fruticosus* agg. (six native plants). The weed species posing the greatest threat in terms of number of native animal species impacted were *Ligustrum lucidum* and *Ligustrum sinense* (both five native animals), followed by *Delairea odorata*, *Eragrostis curvula* and *Salix* spp. (all four native animals).

For the HNCMA 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).

Impact of widespread weeds on priority habitats, corridors and wetlands

Weed threats were identified for all priority habitats, corridors and wetlands in the HNCMA region. Each habitat, corridor and wetland was threatened by an average of 33, 13, and seven weed species respectively (Table C8).

The priority habitat threatened by the greatest number of high priority weeds was Alluvial Forests and Wetlands (55 high priority weeds), followed by Grassy Woodlands (43 high priority weeds). Fifteen high priority weeds were identified as threatening 3 or more priority habitats in HNCMA region, including *Araujia sericifera*, *Berberis aristata*, *Buddleja davidii*, *Crocosmia x crocosmiiflora*, *Cytisus scoparius*, *Eichhornia crassipes*, *Gleditsia triacanthos*, *Juncus acutus*, *Ligustrum sinense*, *Lonicera japonica*, *Ludwigia peruviana*, *Rubus fruticosus* agg., *Salix* spp., *Salvinia molesta* and *Tradescantia fluminensis*.

The priority corridors threatened by the greatest number of high priority weeds included Woronora Plateau to Warragamba (25 high priority weeds), followed by Burrorang Valley to Tarlo River NP (22 high priority weeds). *Rubus fruticosus* agg. was identified as having an impact at all eight priority corridors in the region, while *Eragrostis curvula*, *Ligustrum lucidum* and *Nassella trichotoma* were identified as problems for five.

The wetlands of national significance threatened by the greatest number of high priority weeds included the Blue Mountains Sedge Swamps (22 high priority weeds) followed by Longneck Lagoon (17 high priority weeds). The weed species posing greatest threat (in terms of number of wetlands threatened) were *Rubus fruticosus* agg. (six wetlands), followed by *Salix* spp. (five wetlands) and *Eragrostis curvula* (four wetlands).

C3.2.3 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 HNCMA 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 HNCMA region, along with a letter outlining the aims of the project (Appendix C6) 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 517 sites nominated to-date (as at 31 August 2010) for the HNCMA 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 223 sites (or approximately 40% of the total number) in control category 1 (Table C9). 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.

C3.2.4 Review and additional site nominations

A draft of this report was provided to HNCMA 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 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 HNCMA 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 C5. Threatened ecological communities under threat from priority widespread weeds in the HNCMA region as determined by stages 1 and 2.

Priority widespread weed	Threatened ecological community													
	Agnes Banks Woodland	Blue Gum High Forest	Blue Mountains Shale Cap Forest	Castlereagh Swamp Woodland Community	Coastal Saltmarsh	Cooks River/Castlereagh Ironbark Forest	Cumberland Swamp Woodland Community	Duffys Forest Ecological Community	Elderslie Banksia Scrub Forest	Genowian Point <i>Allocasuarina nana</i> Heathland	Littoral Rainforest	Maroota Sands Swamp Forest	Moist Shale Woodland	Montane Peatlands and Swamps
Scientific name														
<i>Acacia baileyana</i>														
<i>Acacia saligna</i>														
<i>Acer negundo</i>														
<i>Acer pseudoplatanus</i>														
<i>Acetosa sagittata</i>														
<i>Ageratina adenophora</i>														
<i>Ageratina riparia</i>														
<i>Ailanthus altissima</i>														
<i>Alternanthera philoxeroides</i>														
<i>Anredera cordifolia</i>														
<i>Anthoxanthum odoratum</i>														
<i>Araujia sericifera</i>														
<i>Arundo donax</i>														
<i>Asparagus aethiopicus</i>														
<i>Asparagus asparagoides</i>														
<i>Berberis aristata</i>														
<i>Bryophyllum delagoense</i>														
<i>Buddleja davidii</i>														
<i>Cardiospermum grandiflorum</i>														
<i>Cestrum parqui</i>														
<i>Chloris gayana</i>														
<i>Cortaderia jubata</i>														
<i>Cortaderia selloana</i>														
<i>Crataegus monogyna</i>														
<i>Crocosmia x crocosmiiflora</i>														
<i>Cyperus eragrostis</i>														
<i>Cytisus scoparius</i>														
<i>Delairea odorata</i>														
<i>Echium plantagineum</i>														
<i>Echium vulgare</i>														
<i>Egeria densa</i>														
<i>Eichhornia crassipes</i>														
<i>Eragrostis curvula</i>														
<i>Erica lusitanica</i>														
<i>Erigeron karvinskianus</i>														
<i>Erythrina</i> spp.														
<i>Genista monspessulana</i>														
<i>Gleditsia triacanthos</i>														
<i>Grevillia robusta</i>														
<i>Gymnocoronis spilanthoides</i>														
<i>Hedera helix</i>														
<i>Heliotropium amplexicaule</i>														
<i>Holcus lanatus</i>														
<i>Hypericum perforatum</i>														

Threatened ecological community		Other
Mount Gibraltar Forest		
Natural Temperate Grassland of the Southern Tablelands		
Newnes Plateau Shrub Swamp		
O'Hares Creek Shale Forest		
Pittwater Spotted Gum Forest		
River-Flat Eucalypt Forest on Coastal Floodplains		
Robertson Basalt Tall Open-Forest		
Robertson Rainforest		
Shale Gravel Transition Forest		
Shale/Sandstone Transition Forest		
Southern Highlands Shale Woodlands		
Sun Valley Cabbage Gum Forest		
Swamp Oak Floodplain Forest		
Swamp Sclerophyll Forest on Coastal Floodplains		
Sydney Freshwater Wetlands		
Sydney Turpentine-Ironbark Forest		
Temperate Highland Peat Swamps on sandstone		
Western Sydney Dry Rainforest		
White Box Yellow Box Blakely's Red Gum Woodland		
Biodiversity at altitude at Kanangra		
Basalt Cap Forest at Mt Wilson		

Priority widespread weed	Threatened ecological community													
Scientific name	Agnes Banks Woodland	Blue Gum High Forest	Blue Mountains Shale Cap Forest	Castlereagh Swamp Woodland Community	Coastal Saltmarsh	Cooks River/Castlereagh Ironbark Forest	Cumberland Swamp Woodland Community	Duffys Forest Ecological Community	Elderslie Banksia Scrub Forest	Genowlan Point <i>Allocasuarina nana</i> Heathland	Littoral Rainforest	Maroota Sands Swamp Forest	Moist Shale Woodland	Montane Peatlands and Swamps
<i>Hypericum</i> spp.														
<i>Ilex aquifolium</i>														
<i>Ipomoea indica</i>														
<i>Ipomoea purpurea</i>														
<i>Jasminum polyanthum</i>														
<i>Juncus acutus</i>														
<i>Juncus articulatus</i>														
<i>Juncus microcephalus</i>														
<i>Leucanthemum vulgare</i>														
<i>Leycesteria formosa</i>														
<i>Ligustrum lucidum</i>														
<i>Ligustrum sinense</i>														
<i>Lonicera japonica</i>														
<i>Ludwigia longifolia</i>														
<i>Ludwigia peruviana</i>														
<i>Lycium ferocissimum</i>														
<i>Macfadyena unguis-cati</i>														
<i>Nassella neesiana</i>														
<i>Nassella trichotoma</i>														
<i>Ochna serrulata</i>														
<i>Olea europaea</i> subsp. <i>cuspidata</i>														
<i>Opuntia</i> spp.														
<i>Paspalum dilatatum</i>														
<i>Paspalum quadrifarium</i>														
<i>Pennisetum clandestinum</i>														
<i>Phalaris aquatica</i>														
<i>Phyllostachys aurea</i>														
<i>Phytolacca octandra</i>														
<i>Pinus radiata</i>														
<i>Populus alba</i>														
<i>Prunus</i> spp.														
<i>Ranunculus repens</i>														
<i>Ricinus communis</i>														
<i>Robinia pseudoacacia</i>														
<i>Rubus fruticosus</i> agg.														
<i>Salix</i> spp.														
<i>Salvinia molesta</i>														
<i>Senecio madagascariensis</i>														
<i>Tradescantia fluminensis</i>														
<i>Ulex europaeus</i>														
<i>Verbena bonariensis</i>														
<i>Vinca major</i>														

Lantana (*Lantana camara*) and bitou bush and boneseed (*Chrysanthemoides monilifera*) were not considered above as their impacts were already determined in the national *Plan to protect environmental assets from lantana* (National Lantana Management Group 2010) and the *NSW Threat Abatement Plan: invasion of native plant communities by Chrysanthemoides monilifera (bitou bush and boneseed)* (DEC 2006).

Threatened ecological community		Other
Mount Gibraltar Forest		
Natural Temperate Grassland of the Southern Tablelands		
Newnes Plateau Shrub Swamp		
O'Hares Creek Shale Forest		
Pittwater Spotted Gum Forest		
River-Flat Eucalypt Forest on Coastal Floodplains		
Robertson Basalt Tall Open-Forest		
Robertson Rainforest		
Shale Gravel Transition Forest		
Shale/Sandstone Transition Forest		
Southern Highlands Shale Woodlands		
Sun Valley Cabbage Gum Forest		
Swamp Oak Floodplain Forest		
Swamp Sclerophyll Forest on Coastal Floodplains		
Sydney Freshwater Wetlands		
Sydney Turpentine-Ironbark Forest		
Temperate Highland Peat Swamps on sandstone		
Western Sydney Dry Rainforest		
White Box Yellow Box Blakeley's Red Gum Woodland		
Biodiversity at altitude at Kanangra		
Basalt Cap Forest at Mt Wilson		

Table C6. Threatened flora species and populations under threat from priority widespread weeds in the HNCMA region as determined by stages 1 and 2.

Native plants impacted	Widespread weed
Scientific name (Common name)	Scientific name (Common name)
<i>Acacia clunies-rossiae</i>	<i>Rubus fruticosus</i> agg. (blackberry)
<i>Acacia pubescens</i> (downy wattle)	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet)
	<i>Nassella neesiana</i> (Chilean needle grass)
<i>Allocasuarina glareicola</i>	<i>Macfadyena unguis-cati</i> (cat's claw creeper)
<i>Carex klaphakei</i> (Klaphake's sedge)	<i>Buddleja davidii</i> (buddleja, butterfly bush)
	<i>Crocosmia x crocosmiiflora</i> (montbretia)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
	<i>Ulex europaeus</i> (gorse, furze)
<i>Cynanchum elegans</i> (white-flowered wax plant)	<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)
<i>Darwinia biflora</i>	<i>Eragrostis curvula</i> (African lovegrass)
<i>Dillwynia tenuifolia</i>	<i>Asparagus aethiopicus</i> (asparagus fern)
	<i>Eragrostis curvula</i> (African lovegrass)
<i>Diuris aquilis</i>	<i>Leucanthemum vulgare</i> (ox-eye daisy)
<i>Epacris hamiltonii</i>	<i>Erigeron karvinskianus</i> (bony-tip fleabane, seaside daisy)
	<i>Salix</i> spp. (willow)
	<i>Ulex europaeus</i> (gorse, furze)
<i>Epacris purpurescens</i>	<i>Eragrostis curvula</i> (African lovegrass)
<i>Eucalyptus benthamii</i> (Camden white gum)	<i>Acer negundo</i> (box-elder maple)
	<i>Araujia sericifera</i> (moth vine)
	<i>Cardiospermum grandiflorum</i> (balloon vine)
	<i>Delairea odorata</i> (Cape ivy)
	<i>Gleditsia triacanthos</i> (honey locust)
	<i>Ipomoea indica</i> (blue morning glory)
	<i>Ipomoea purpurea</i> (common morning glory)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
	<i>Ludwigia peruviana</i> (ludwigia, Peruvian water primrose)
	<i>Macfadyena unguis-cati</i> (cat's claw creeper)
	<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)
	<i>Phyllostachys aurea</i> (rhizomatous bamboo)
	<i>Rubus fruticosus</i> agg. (blackberry)
<i>Tradescantia fluminensis</i> (trad)	
<i>Eucalyptus carthuri</i>	<i>Anthoxanthum odoratum</i> (sweet vernal grass)
<i>Grevillea juniperina</i>	<i>Eragrostis curvula</i> (African lovegrass)
<i>Grevillea parviflora</i> (small flower grevillea)	<i>Nassella neesiana</i> (Chilean needle grass)
	<i>Nassella trichotoma</i> (serrated tussock, Yass tussock)
<i>Isopogon fletcherii</i> (Fletcher's drumsticks)	<i>Erica lusitanica</i> (Spanish heath)

Native plants impacted	Widespread weed
Scientific name (Common name)	Scientific name (Common name)
<i>Marsdenia viridiflora</i> (endangered population)	<i>Cardiospermum grandiflorum</i> (balloon vine)
	<i>Cestrum parqui</i> (green cestrum)
	<i>Ipomoea indica</i> (blue morning glory)
	<i>Ipomoea purpurea</i> (common morning glory)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
	<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)
<i>Microstrobos fitzgeraldii</i> (dwarf mountain pine)	<i>Acer negundo</i> (box-elder maple)
	<i>Buddleja davidii</i> (buddleja, butterfly bush)
	<i>Crocsmia x crocosmiiflora</i> (montbretia)
	<i>Cytisus scoparius</i> (Scotch broom, English broom)
	<i>Erica lusitanica</i> (Spanish heath)
	<i>Erigeron karvinskianus</i> (bony-tip fleabane, seaside daisy)
	<i>Hedera helix</i> (English ivy)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
	<i>Rubus fruticosus</i> agg. (blackberry)
	<i>Salix</i> spp. (willow)
	<i>Microtis angusii</i> (Angus' onion orchid)
<i>Tradescantia fluminensis</i> (trad)	
<i>Persoonia glaucescens</i> (Mittagong geebung)	<i>Ligustrum sinense</i> (small-leaf privet)
<i>Persoonia nutans</i> (nodding geebung)	<i>Eragrostis curvula</i> (African lovegrass)
	<i>Nassella neesiana</i> (Chilean needle grass)
	<i>Nassella trichotoma</i> (serrated tussock, Yass tussock)
<i>Pimelea curviflora</i> var. <i>curviflora</i>	<i>Rubus fruticosus</i> agg. (blackberry)
<i>Pimelea spicata</i>	<i>Asparagus asparagoides</i> (bridal creeper, florist's smilax)
	<i>Chloris gayana</i> (Rhodes grass)
	<i>Eragrostis curvula</i> (African lovegrass)
	<i>Nassella neesiana</i> (Chilean needle grass)
	<i>Nassella trichotoma</i> (serrated tussock, Yass tussock)
	<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)
	<i>Rubus fruticosus</i> agg. (blackberry)

Native plants impacted	Widespread weed
Scientific name (Common name)	Scientific name (Common name)
<i>Pomaderris brunnea</i> (brown pomaderris)	<i>Acer negundo</i> (box-elder maple)
	<i>Cardiospermum grandiflorum</i> (balloon vine)
	<i>Gleditsia triacanthos</i> (honey locust)
	<i>Ipomoea indica</i> (blue morning glory)
	<i>Ipomoea purpurea</i> (common morning glory)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
	<i>Ludwigia peruviana</i> (Ludwigia/Peruvian water primrose)
	<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)
	<i>Phyllostachys aurea</i> (rhizomatous bamboo, fishpole bamboo)
<i>Tradescantia fluminensis</i> (trad)	
<i>Pterostylis saxicola</i> (Sydney Plains greenhood)	<i>Eragrostis curvula</i> (African lovegrass)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)
	<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)
<i>Pultenaea glabra</i> (smooth bush-pea)	<i>Rubus fruticosus</i> agg. (blackberry)
	<i>Erica lusitanica</i> (Spanish heath)
	<i>Ilex aquifolium</i> (English holly, common holly)
	<i>Ulex europaeus</i> (gorse, furze)
	<i>Juncus articulatus</i> (joint rush)
	<i>Juncus microcephalus</i>
	<i>Leucanthemum vulgare</i> (ox-eye daisy)
	<i>Leycesteria formosa</i> (Himalaya honeysuckle)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
<i>Ranunculus repens</i> (creeping buttercup)	
<i>Rutidosis leptorrhynchoides</i> (button wrinklewort)	<i>Eragrostis curvula</i> (African lovegrass)
<i>Xanthosia scopulicola</i>	<i>Delairea odorata</i> (Cape ivy)
	<i>Erigeron karvinskianus</i> (bony-tip fleabane, seaside daisy)
<i>Zieria involucreta</i>	<i>Erigeron karvinskianus</i> (bony-tip fleabane, seaside daisy)

Lantana (*Lantana camara*) and bitou bush and boneseed (*Chrysanthemoides monilifera*) were not considered above as their impacts were already determined in the national *Plan to protect environmental assets from lantana* (National Lantana Management Group 2010) and the *NSW Threat Abatement Plan: invasion of native plant communities by Chrysanthemoides monilifera (bitou bush and boneseed)* (DEC 2006).

Table C7. Threatened fauna species under threat from priority widespread weeds in HNCMA region as determined in stages 1 and 2.

Native fauna impacted	Widespread weed
Scientific name (Common name)	Scientific name (Common name)
<i>Calyptorhynchus lathamii</i> (glossy black cockatoo)	<i>Ipomoea indica</i> (blue morning glory)
	<i>Ipomoea purpurea</i> (common morning glory)
<i>Climacteris picumnus victoriae</i> (brown treecreeper)	<i>Cestrum parqui</i> (green cestrum)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet)
<i>Eulamprus leuraensis</i> (Blue Mountains water skink)	<i>Anthoxanthum odoratum</i> (sweet vernal grass)
	<i>Berberis aristata</i> (Nepal barberry)
	<i>Buddleja davidii</i> (buddleja, butterfly bush)
	<i>Crocsmia x crocosmiiflora</i> (montbretia)
	<i>Cytisus scoparius</i> (Scotch broom, English broom)
	<i>Echium plantagineum</i> (Paterson's curse)
	<i>Erica lusitanica</i> (Spanish heath)
	<i>Eragrostis curvula</i> (African lovegrass)
	<i>Hypericum androsaemum</i> (tutsan)
	<i>Ilex aquifolium</i> (English holly, common holly)
	<i>Juncus articulatus</i> (joint rush)
	<i>Juncus microcephalus</i>
	<i>Leucanthemum vulgare</i> (ox-eye daisy)
	<i>Leycesteria formosa</i> (Himalaya honeysuckle)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
	<i>Pinus radiata</i> (radiata pine, Monterey pine)
	<i>Prunus laurocerasus</i> (cherry laurel)
	<i>Ranunculus repens</i> (creeping buttercup)
	<i>Ulex europaeus</i> (gorse, furze)
	<i>Vinca major</i> (blue periwinkle, greater periwinkle)
<i>Heleioporus australiacus</i> (giant burrowing frog)	<i>Asparagus aethiopicus</i> (asparagus 'fern', sprengeri fern)
<i>Litoria aurea</i> (green and golden bell frog)	<i>Acer negundo</i> (box-elder maple)
	<i>Alternanthera philoxeroides</i> (alligator weed)
	<i>Ludwigia peruviana</i> (ludwigia, Peruvian water primrose)
	<i>Salix</i> spp. (willow)
<i>Litoria booroolongensis</i> (booroolong frog)	<i>Acer negundo</i> (box-elder maple)
	<i>Eragrostis curvula</i> (African lovegrass)
	<i>Salix</i> spp. (willows)
<i>Macquaria australasica</i> (Macquarie perch)	<i>Acer negundo</i> (box-elder maple)
	<i>Alternanthera philoxeroides</i> (alligator weed)
	<i>Egeria densa</i> (egeria)
	<i>Eichhornia crassipes</i> (water hyacinth)
	<i>Ludwigia peruviana</i> (ludwigia/Peruvian water primrose)
	<i>Salix</i> spp. (willow)
	<i>Salvinia molesta</i> (salvinia)

Native fauna impacted	Widespread weed
Scientific name (Common name)	Scientific name (Common name)
<i>Meridolum corneovirens</i> (Cumberland land snail)	<i>Alternanthera philoxeroides</i> (alligator weed)
	<i>Asparagus aethiopicus</i> (asparagus 'fern', sprengerii fern)
	<i>Cestrum parqui</i> (green cestrum)
	<i>Delairea odorata</i> (Cape ivy)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)
	<i>Nassella neesiana</i> (Chilean needle grass)
	<i>Nassella trichotoma</i> (serrated tussock, Yass tussock)
	<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)
	<i>Tradescantia fluminensis</i> (trad)
<i>Mixophyes balbus</i> (stuttering barred frog)	<i>Salix</i> spp. (willows)
<i>Myotis adversus</i> (large-footed myotis)	<i>Arundo donax</i> (Spanish reed, giant reed)
<i>Neophema pulchella</i> (turquoise parrot)	<i>Delairea odorata</i> (Cape ivy)
<i>Pandion haliaetus</i> (osprey)	<i>Gleditsia triacanthos</i> (honey locust)
	<i>Ipomoea indica</i> (blue morning glory)
<i>Paralucia spinifera</i> (purple copper butterfly)	<i>Cotoneaster</i> spp. (cotoneaster)
	<i>Cytisus scoparius</i> (Scotch broom, English broom)
	<i>Crataegus monogyna</i> (hawthorn)
	<i>Genista monspessulana</i> (Montpellier broom, French broom)
	<i>Pinus radiata</i> (radiata pine, Monterey pine)
	<i>Pyracantha</i> spp. (orange firethorn)
<i>Petalura gigantea</i> (giant dragonfly)	<i>Anthoxanthum odoratum</i> (sweet vernal grass)
	<i>Berberis aristata</i> (Nepal barberry)
	<i>Buddleja davidii</i> (buddleja, butterfly bush)
	<i>Crocsmia x crocosmiiflora</i> (montbretia)
	<i>Cytisus scoparius</i> (Scotch broom, English broom)
	<i>Egeria densa</i> (egeria)
	<i>Eichhornia crassipes</i> (water hyacinth)
	<i>Eragrostis curvula</i> (African lovegrass)
	<i>Erica lusitanica</i> (Spanish heath)
	<i>Holcus lanatus</i> (Yorkshire fog)
	<i>Hypericum</i> spp. (tutsan)
	<i>Ilex aquifolium</i> (English holly, common holly)
	<i>Juncus articulatus</i> (joint rush)
	<i>Juncus microcephalus</i>
	<i>Leucanthemum vulgare</i> (ox-eye daisy)
	<i>Leycesteria formosa</i> (Himalaya honeysuckle)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
	<i>Pinus radiata</i> (radiata pine, Monterey pine)
	<i>Prunus</i> spp. (cherry laurel)
	<i>Ranunculus repens</i> (creeping buttercup)
<i>Salvinia molesta</i> (salvinia)	
<i>Ulex europaeus</i> (gorse, furze)	

Native fauna impacted	Widespread weed
Scientific name (Common name)	Scientific name (Common name)
<i>Petaurus australis</i> (yellow-bellied gilder)	<i>Delairea odorata</i> (Cape ivy)
<i>Petrogale penicillata</i> (brush-tailed rock-wallaby)	<i>Delairea odorata</i> (Cape ivy)
	<i>Hypericum</i> spp. (tutsan)
<i>Pseudophryne australis</i> (red-crowned toadlet)	<i>Asparagus aethiopicus</i> (asparagus fern, sprengeri fern)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)
	<i>Tradescantia fluminensis</i> (trad)
<i>Pteropus poliocephalus</i> (grey-headed flying fox)	<i>Ipomoea indica</i> (blue morning glory)
	<i>Ipomoea purpurea</i> (common morning glory)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)
	<i>Lonicera japonica</i> (Japanese honeysuckle)
	<i>Macfadyena unguis-cati</i> (cat's claw creeper)
<i>Pyrrholaemus sagittatus</i> (speckled warbler)	<i>Cestrum parqui</i> (green cestrum)
	<i>Ligustrum lucidum</i> (large-leaf privet)
	<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)
<i>Scoteanax rueppellii</i> (greater broad-nosed bat)	<i>Arundo donax</i> (Spanish reed, giant reed)
<i>Varanus rosenbergi</i> (Rosenberg's goanna)	<i>Eragrostis curvula</i> (African lovegrass)
<i>Xanthomyza phrygia</i> (regent honeyeater)	<i>Ailanthus altissima</i> (tree of heaven)

Lantana (*Lantana camara*) and bitou bush and boneseed (*Chrysanthemoides monilifera*) were not considered above as their impacts were already determined in the national *Plan to protect environmental assets from lantana* (National Lantana Management Group 2010) and the *NSW Threat Abatement Plan: invasion of native plant communities by Chrysanthemoides monilifera (bitou bush and boneseed)* (DEC 2006).

Table C8. Priority habitats, corridors and nationally significant wetlands under threat from widespread weeds as determined in stages 1 and 2 (see Appendix C5 for location and descriptions of priority habitats and corridors).

High priority widespread weed	Priority habitats				Priority corridors										Wetlands					
	Grassy Woodlands	Upland Swamps	Alluvial Forests and Wetlands	Coastal Wetlands	Hunter Valley to Hawkesbury River	Capertee to Wollemi NP	Blue Mountains Western Escarpment	Illawarra Escarpment Moist Forest	Woronora Plateau to Warragamba	Bargo to Morton NP	Burrangorang Valley to Tarlo River NP	Abercrombie River to Morton NP	Blue Mountains Sedge Swamps	Boyd Plateau Bogs	Lake Bathurst and the Morass	Long Swamp/Hanging Rock Swamp	Longneck Lagoon	Pitt Town Lagoon	Thirlmere Lakes	Wingecarribee Swamp
<i>Scientific name</i>																				
<i>Acacia baileyana</i>																				
<i>Acacia saligna</i>																				
<i>Acer negundo</i>																				
<i>Acer pseudoplatanus</i>																				
<i>Acetosa sagittata</i>																				
<i>Ageratina adenophora</i>																				
<i>Ageratina riparia</i>																				
<i>Ailanthus altissima</i>																				
<i>Alternanthera philoxeroides</i>																				
<i>Anredera cordifolia</i>																				
<i>Anthoxanthum odoratum</i>																				

High priority widespread weed	Priority habitats				Priority corridors								Wetlands							
	Grassy Woodlands	Upland Swamps	Alluvial Forests and Wetlands	Coastal Wetlands	Hunter Valley to Hawkesbury River	Capertee to Wollemi NP	Blue Mountains Western Escarpment	Illawarra Escarpment Moist Forest	Woronora Plateau to Warragamba	Bargo to Morton NP	Burragarang Valley to Tarlo River NP	Abercrombie River to Morton NP	Blue Mountains Sedge Swamps	Boyd Plateau Bogs	Lake Bathurst and the Morass	Long Swamp/Hanging Rock Swamp	Longneck Lagoon	Pitt Town Lagoon	Thirlmere Lakes	Wingecarribee Swamp
<i>Araujia sericifera</i>																				
<i>Arundo donax</i>																				
<i>Asparagus aethiopicus</i>																				
<i>Asparagus asparagoides</i>																				
<i>Berberis aristata</i>																				
<i>Bryophyllum delagoense</i>																				
<i>Buddleja davidii</i>																				
<i>Cardiospermum grandiflorum</i>																				
<i>Cestrum parqui</i>																				
<i>Chloris gayana</i>																				
<i>Cortaderia jubata</i>																				
<i>Cortaderia selloana</i>																				
<i>Crataegus monogyna</i>																				
<i>Crocosmia x crocosmiiflora</i>																				
<i>Cyperus eragrostis</i>																				
<i>Cytisus scoparius</i>																				
<i>Delairea odorata</i>																				
<i>Echium plantagineum</i>																				
<i>Egeria densa</i>																				
<i>Eichhornia crassipes</i>																				
<i>Eragrostis curvula</i>																				
<i>Erica lusitanica</i>																				
<i>Erigeron karvinskianus</i>																				
<i>Erythrina</i> spp.																				
<i>Genista monspessulana</i>																				
<i>Gleditsia triacanthos</i>																				
<i>Grevillia robusta</i>																				
<i>Gymnocoronis spilanthoides</i>																				
<i>Hedera helix</i>																				
<i>Holcus lanatus</i>																				
<i>Hypericum perforatum</i>																				
<i>Hypericum</i> spp.																				
<i>Ilex aquifolium</i>																				
<i>Ipomoea indica</i>																				
<i>Ipomoea purpurea</i>																				
<i>Jasminum polyanthum</i>																				
<i>Juncus acutus</i>																				
<i>Juncus articulatus</i>																				

High priority widespread weed	Priority habitats				Priority corridors										Wetlands						
	Grassy Woodlands	Upland Swamps	Alluvial Forests and Wetlands	Coastal Wetlands	Hunter Valley to Hawkesbury River	Capertee to Wollemi NP	Blue Mountains Western Escarpment	Illawarra Escarpment Moist Forest	Woronora Plateau to Warragamba	Bargo to Morton NP	Burrangorang Valley to Tarlo River NP	Abercrombie River to Morton NP	Blue Mountains Sedge Swamps	Boyd Plateau Bogs	Lake Bathurst and the Morass	Long Swamp/Hanging Rock Swamp	Longneck Lagoon	Pitt Town Lagoon	Thirlmere Lakes	Wingecarribee Swamp	
Scientific name																					
<i>Juncus microcephalus</i>																					
<i>Leucanthemum vulgare</i>																					
<i>Leycesteria formosa</i>																					
<i>Ligustrum lucidum</i>																					
<i>Ligustrum sinense</i>																					
<i>Lonicera japonica</i>																					
<i>Ludwigia longifolia</i>																					
<i>Ludwigia peruviana</i>																					
<i>Lycium ferocissimum</i>																					
<i>Macfadyena unguis-cati</i>																					
<i>Nassella neesiana</i>																					
<i>Nassella trichotoma</i>																					
<i>Ochna serrulata</i>																					
<i>Olea europaea</i> subsp. <i>cuspidata</i>																					
<i>Opuntia</i> spp.																					
<i>Paspalum dilatatum</i>																					
<i>Paspalum quadrifarium</i>																					
<i>Pennisetum clandestinum</i>																					
<i>Phalaris aquatica</i>																					
<i>Phyllostachys aurea</i>																					
<i>Pinus radiata</i>																					
<i>Populus alba</i>																					
<i>Prunus</i> spp.																					
<i>Ranunculus repens</i>																					
<i>Ricinus communis</i>																					
<i>Robinia pseudoacacia</i>																					
<i>Rubus fruticosus</i> agg.																					
<i>Salix</i> spp.																					
<i>Salvinia molesta</i>																					
<i>Senecio madagascariensis</i>																					
<i>Tradescantia fluminensis</i>																					
<i>Ulex europaeus</i>																					
<i>Verbena bonariensis</i>																					
<i>Vinca major</i>																					

Lantana (*Lantana camara*) and bitou bush and boneseed (*Chrysanthemoides monilifera*) were not considered above as their impacts were already determined in the national *Plan to protect environmental assets from lantana* (National Lantana Management Group 2010) and the *NSW Threat Abatement Plan: invasion of native plant communities by Chrysanthemoides monilifera (bitou bush and boneseed)* (DEC 2006).

Table C9. The number of sites in each of the six categories.

	Categories						Not valid [^]	Total
	1*	2	3	4	5	6		
Number of sites	223	44	90	70	21	6	63	517

*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.

C4. SURVEY OF CURRENT WEED PROGRAMS IN THE HAWKESBURY-NEPEAN CMA REGION

C4.1 Purpose

The aim of this survey was to compile an inventory of weed control programs in the HNCMA region with respect to weed management for biodiversity conservation in 2007/08.

C4.2 Participant summary

A survey of current weed programs (Appendix C7) was sent out to over 100 stakeholders within the HNCMA region. The survey was also made available on the HNCMA project webpage for stakeholders to download. Responses to the survey were received from 15 stakeholders representing the following organisations:

- » Barragal Landcare Group
- » Blue Mountains City Council
- » DECCW - Blue Mountains
- » DECCW - Lithgow
- » DECCW - Lower Hawkesbury
- » Hawkesbury River County Council
- » HNCMA-Goulburn
- » Ku-ring-gai Council
- » Penrith City Council
- » Private Consultant Bush Regenerator
- » Rural Lands Protection Board - Goulburn
- » Upper Lachlan Council

While only 15 stakeholders responded, their answers detailed information on 246 weed control programs across the HNCMA region.

C4.3 Results

C4.3.1 Purpose of weed control

Question 1 - What is the primary aim of your control program?

Of the 244 responses to this question, 192 (79%) listed biodiversity conservation as their primary aim (Table C10), although for 67 weed programs the biodiversity they were trying to protect was not named. Details of the biodiversity identified as being protected during weed control programs and the weeds controlled for 125 responses are provided in Table C11. The next most common primary aims were eradication and legislation (e.g. noxious weed listing) representing 9% and 6% of control programs, respectively (Table C10).

Table C10. The primary aim of 244 weed control programs in the HNCMA region.

Primary aim of weed control program	No. of responses	%
biodiversity conservation	192	78.7
legislation (e.g. noxious weed listing)	15	6.1
cultural heritage protection	0	0.0
eradication	22	9.0
containment	5	2.0
neighbour/public relations	4	1.6
asset protection	2	0.8
other	4	1.6

Table C11. Compilation of responses for the biodiversity named as being protected by weed control programs and the weeds being controlled across the HNCMA region.

Biodiversity being protected by weed control programs in the HNCMA region	Weeds being controlled to protect the biodiversity at risk
Threatened ecological community	
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion	<i>Ageratina adenophora</i> , <i>Anredera cordifolia</i> , <i>Cardiospermum grandiflorum</i> , <i>Cinnamomum camphora</i> , <i>Coreopsis lanceolata</i> , <i>Cotoneaster</i> spp., <i>Delairea odorata</i> , <i>Genista monspessulana</i> , <i>Ipomoea indica</i> , <i>Jasminum polyanthum</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Ranunculus repens</i> , <i>Rubus fruticosus</i> agg., <i>Tradescantia fluminensis</i>
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	<i>Lantana camara</i>
Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion	<i>Lantana camara</i>
Cumberland Plain Woodland	<i>Alternanthera philoxeroides</i> , <i>Andropogon virginicus</i> , <i>Araujia sericifera</i> , <i>Asparagus asparagoides</i> , <i>Bryophyllum delagoense</i> , <i>Cardiospermum grandiflorum</i> , <i>Cestrum parqui</i> , <i>Eragrostis curvula</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Lycium ferocissimum</i> , <i>Olea europaea</i> subsp. <i>cuspidata</i> , <i>Paspalum dilatatum</i> , <i>Passiflora subpeltata</i> , <i>Rubus bicolor</i> , <i>Senecio madagascariensis</i> , <i>Sida rhombifolia</i> , <i>Solanum pseudocapsicum</i> , <i>Sporobolus fertilis</i> , <i>Tradescantia fluminensis</i>
Natural Temperate Grassland of the Southern Tablelands (NSW and ACT)	<i>Eragrostis curvula</i> , <i>Nassella neesiana</i> , <i>Nassella trichotoma</i>
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	<i>Acer negundo</i> , <i>Acetosa sagittata</i> , <i>Agapanthus praecox</i> subsp. <i>orientalis</i> , <i>Ageratina adenophora</i> , <i>Ailanthus altissima</i> , <i>Alnus glutinosa</i> , <i>Alternanthera philoxeroides</i> , <i>Andropogon virginicus</i> , <i>Anredera cordifolia</i> , <i>Araujia sericifera</i> , <i>Arundo donax</i> , <i>Asparagus asparagoides</i> , <i>Axonopus fissifolius</i> , <i>Buddleja davidii</i> , <i>Cardiospermum grandiflorum</i> , <i>Cestrum parqui</i> , <i>Chloris gayana</i> , <i>Cinnamomum camphora</i> , <i>Cirsium vulgare</i> , <i>Conyza</i> spp., <i>Coreopsis lanceolata</i> , <i>Cotoneaster</i> spp., <i>Crocasmia x crocosmiiflora</i> , <i>Cytisus scoparius</i> , <i>Delairea odorata</i> , <i>Ehrharta erecta</i> , <i>Eragrostis curvula</i> , <i>Erica lusitanica</i> , <i>Erigeron karvinskianus</i> , <i>Genista monspessulana</i> , <i>Gleditsia triacanthos</i> , <i>Hypericum androsaemum</i> , <i>Hypericum kouytchense</i> , <i>Ilex aquifolium</i> , <i>Ipomoea indica</i> , <i>Jasminum polyanthum</i> , <i>Lantana camara</i> , <i>Leucanthamum x superbum</i> , <i>Leycesteria formosa</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Lycium ferocissimum</i> , <i>Myosotis discolor</i> , <i>Ochna serrulata</i> , <i>Olea europaea</i> subsp. <i>cuspidata</i> , <i>Opuntia</i> spp., <i>Paspalum dilatatum</i> , <i>Phyllostachys aurea</i> , <i>Pinus radiata</i> , <i>Ranunculus repens</i> , <i>Ricinus communis</i> , <i>Rubus fruticosus</i> agg., <i>Salix</i> spp., <i>Senecio madagascariensis</i> , <i>Senna pendula</i> , <i>Sida rhombifolia</i> , <i>Solanum mauritianum</i> , <i>Solanum pseudocapsicum</i> , <i>Tradescantia fluminensis</i> , <i>Vinca major</i>
Shale Gravel Transition Forest in the Sydney Basin Bioregion	<i>Bryophyllum delagoense</i> , <i>Eragrostis curvula</i>

Biodiversity being protected by weed control programs in the HNCMA region	Weeds being controlled to protect the biodiversity at risk
Sun Valley Cabbage Gum Forest in the Sydney Basin Bioregion	<i>Ageratina adenophora</i> , <i>Anredera cordifolia</i> , <i>Cardiospermum grandiflorum</i> , <i>Cinnamomum camphora</i> , <i>Coreopsis lanceolata</i> , <i>Cotoneaster</i> spp., <i>Delairea odorata</i> , <i>Genista monspessulana</i> , <i>Ipomoea indica</i> , <i>Jasminum polyanthum</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Ranunculus repens</i> , <i>Rubus fruticosus</i> agg., <i>Tradescantia fluminensis</i>
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions	<i>Celtis occidentalis</i> , <i>Gleditsia triacanthos</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Lycium ferocissimum</i> , <i>Nassella neesiana</i> , <i>Olea europaea</i> subsp. <i>cuspidata</i> , <i>Paspalum dilatatum</i>
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	<i>Alternanthera philoxeroides</i> , <i>Gleditsia triacanthos</i> , <i>Ligustrum lucidum</i> , <i>Lycium ferocissimum</i> , <i>Nassella neesiana</i> , <i>Olea europaea</i> subsp. <i>cuspidata</i> , <i>Paspalum dilatatum</i> , <i>Sporobolus fertilis</i>
Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	<i>Acer negundo</i> , <i>Agapanthus praecox</i> spp. <i>orientalis</i> , <i>Ageratina adenophora</i> , <i>Alnus glutinosa</i> , <i>Anredera cordifolia</i> , <i>Arundo donax</i> , <i>Asparagus aethiopicus</i> , <i>Buddleja davidii</i> , <i>Cardiospermum grandiflorum</i> , <i>Cinnamomum camphora</i> , <i>Coreopsis lanceolata</i> , <i>Cotoneaster</i> species, <i>Crococsmia x crocosmiiflora</i> , <i>Cytisus scoparius</i> , <i>Delairea odorata</i> , <i>Dietes</i> spp., <i>Erica lusitanica</i> , <i>Erigeron karvinskianus</i> , <i>Genista monspessulana</i> , <i>Hedychium gardnerianum</i> , <i>Hypericum androsaemum</i> , <i>Hypericum kouytchense</i> , <i>Ilex aquifolium</i> , <i>Ipomoea indica</i> , <i>Jasminum polyanthum</i> , <i>Lantana camara</i> , <i>Leucanthamum x superbum</i> , <i>Leycesteria formosa</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lilium formosum</i> , <i>Lonicera japonica</i> , <i>Myosotis discolor</i> , <i>Ochna serrulata</i> , <i>Olea europea</i> subsp. <i>cuspidata</i> , <i>Passiflora edulis</i> , <i>Photinia serratifolia</i> , <i>Pinus radiata</i> , <i>Ranunculus repens</i> , <i>Rubus fruticosus</i> agg., <i>Senna pendula</i> , <i>Salix cinerea</i> , <i>Solanum mauritianum</i> , <i>Tradescantia fluminensis</i>
Temperate Highland Peat Swamps on Sandstone	<i>Acer negundo</i> , <i>Agapanthus praecox</i> subsp. <i>orientalis</i> , <i>Ageratina adenophora</i> , <i>Alnus glutinosa</i> , <i>Arundo donax</i> , <i>Berberis aristata</i> , <i>Buddleja davidii</i> , <i>Cotoneaster</i> spp., <i>Crococsmia x crocosmiiflora</i> , <i>Cytisus scoparius</i> , <i>Erica lusitanica</i> , <i>Erigeron karvinskianus</i> , <i>Genista monspessulana</i> , <i>Hedera helix</i> , <i>Hypericum androsaemum</i> , <i>Hypericum kouytchense</i> , <i>Ilex aquifolium</i> , <i>Leucanthamum x superbum</i> , <i>Leycesteria formosa</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Myosotis discolor</i> , <i>Pinus radiata</i> , <i>Prunus laurocerasus</i> , <i>Ranunculus repens</i> , <i>Rubus fruticosus</i> agg., <i>Salix cinerea</i> , <i>Salix</i> spp., <i>Ulex europaeus</i>
Western Sydney Dry Rainforest	<i>Acetosa sagittata</i> , <i>Ailanthus altissima</i> , <i>Cestrum parqui</i> , <i>Ehrharta erecta</i> , <i>Lantana camara</i> , <i>Ligustrum sinense</i> , <i>Ochna serrulata</i> , <i>Ricinus communis</i> , <i>Solanum mauritianum</i> , <i>Tradescantia fluminensis</i>
White Box Yellow Box Blakely's Red Gum Woodland	<i>Nassella trichotoma</i> , <i>Opuntia</i> spp., <i>Rubus fruticosus</i> agg.

Native plant species

<i>Acacia clunies-rossiae</i> (kanangra wattle)	<i>Ageratina adenophora</i> , <i>Rubus fruticosus</i> agg., <i>Salix</i> spp.
<i>Acacia pubescens</i> (downy wattle)	<i>Eragrostis curvula</i>
<i>Acronychia oblongifolia</i>	<i>Ageratina adenophora</i> , <i>Lantana camara</i> , <i>Senna pendula</i> , <i>Solanum mauritianum</i>
<i>Alectryon subcinereus</i>	<i>Acetosa sagittata</i> , <i>Ailanthus altissima</i> , <i>Cestrum parqui</i> , <i>Ehrharta erecta</i> , <i>Lantana camara</i> , <i>Ligustrum sinense</i> , <i>Ochna serrulata</i> , <i>Ricinus communis</i> , <i>Solanum mauritianum</i> , <i>Tradescantia fluminensis</i>
<i>Dillwynia tenuifolia</i>	<i>Bryophyllum delagoense</i> , <i>Eragrostis curvula</i>
<i>Ehretia acuminata</i>	<i>Araujia sericifera</i> , <i>Cardiospermum grandiflorum</i> , <i>Paspalum dilatatum</i> , <i>Sida rhombifolia</i> , <i>Solanum pseudocapsicum</i> , <i>Tradescantia fluminensis</i>
<i>Epacris sparsa</i> (sparse heath)	<i>Rubus fruticosus</i> agg., <i>Salix</i> spp.
Remnant old-growth Eucalypts e.g. <i>E. botryoides</i> x <i>saligna</i>	<i>Gleditsia triacanthos</i> , <i>Ligustrum lucidum</i> , <i>Olea europaea</i> subsp. <i>cuspidata</i>
<i>Olearia cordata</i>	<i>Lantana camara</i>
<i>Pimelea curviflora</i>	<i>Lantana camara</i>

Biodiversity being protected by weed control programs in the HNCMA region	Weeds being controlled to protect the biodiversity at risk
<i>Pomaderris brunnea</i> (brown pomaderris)	<i>Alternanthera philoxeroides</i> , <i>Lycium ferocissimum</i> , <i>Ligustrum lucidum</i> , <i>Olea europaea</i> subsp. <i>cuspidata</i>
<i>Pultenaea parviflora</i>	<i>Eragrostis curvula</i>
<i>Rhodamia rubescens</i>	<i>Ageratina adenophora</i> , <i>Lantana camara</i> , <i>Senna pendula</i> , <i>Solanum mauritianum</i>
<i>Rutidosis leptorrhynchoides</i> (button wrinklewort)	<i>Nassella neesiana</i> , <i>Nassella trichotoma</i> , <i>Eragrostis curvula</i>
<i>Streblus brunonianus</i>	<i>Acetosa sagittata</i> , <i>Ailanthus altissima</i> , <i>Araujia sericifera</i> , <i>Cardiospermum grandiflorum</i> , <i>Cestrum parqui</i> , <i>Ehrharta erecta</i> , <i>Lantana camara</i> , <i>Ligustrum sinense</i> , <i>Ochna serrulata</i> , <i>Paspalum dilatatum</i> , <i>Ricinus communis</i> , <i>Sida rhombifolia</i> , <i>Solanum mauritianum</i> , <i>Solanum pseudocapsicum</i> , <i>Tradescantia fluminensis</i>
<i>Zieria involucrata</i>	<i>Lantana camara</i>

Native animal species

<i>Aquila audax</i> (nesting pair of wedge-tail eagles)	<i>Olea europaea</i> subsp. <i>cuspidata</i> , <i>Rubus bicolor</i> , <i>Sporobolus fertilis</i>
<i>Callocephalon fimbriatum</i> (gang-gang cockatoo)	<i>Acetosa sagittata</i> , <i>Anredera cordifolia</i> , <i>Araujia sericifera</i> , <i>Asparagus asparagoides</i> , <i>Ehrharta erecta</i> , <i>Eragrostis curvula</i> , <i>Cardiospermum grandiflorum</i> , <i>Chloris gayana</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Ochna serrulata</i> , <i>Paspalum dilatatum</i> , <i>Phyllostachys aurea</i> , <i>Rubus fruticosus</i> agg., <i>Sida rhombifolia</i> , <i>Tradescantia fluminensis</i>
<i>Delma impar</i> (striped legless lizard)	<i>Eragrostis curvula</i> , <i>Nassella trichotoma</i>
<i>Eulamprus leuraensis</i> (Blue Mountains water skink)	<i>Buddleja davidii</i> , <i>Crococsmia x crocosmiiflora</i> , <i>Cytisus scoparius</i> , <i>Erica lusitanica</i> , <i>Hypericum androsaemum</i> , <i>Hypericum kouytchense</i> , <i>Leycesteria formosa</i> , <i>Lonicera japonica</i> , <i>Pinus radiata</i> , <i>Rubus fruticosus</i> agg., <i>Salix cinerea</i>
<i>Meridolum corneovirens</i> (Cumberland land snail)	<i>Acetosa sagittata</i> , <i>Anredera cordifolia</i> , <i>Araujia sericifera</i> , <i>Asparagus asparagoides</i> , <i>Cardiospermum grandiflorum</i> , <i>Celtis occidentalis</i> , <i>Chloris gayana</i> , <i>Ehrharta erecta</i> , <i>Eragrostis curvula</i> , <i>Gleditsia triacanthos</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Lycium ferocissimum</i> , <i>Nassella neesiana</i> , <i>Ochna serrulata</i> , <i>Olea europaea</i> subsp. <i>cuspidata</i> , <i>Paspalum dilatatum</i> , <i>Phyllostachys aurea</i> , <i>Rubus fruticosus</i> agg., <i>Sida rhombifolia</i> , <i>Tradescantia fluminensis</i>
<i>Ninox strenua</i> (powerful owl)	<i>Andropogon virginicus</i> , <i>Anredera cordifolia</i> , <i>Asparagus asparagoides</i> , <i>Ligustrum sinense</i> , <i>Paspalum dilatatum</i> , <i>Olea europaea</i> subsp. <i>cuspidata</i> , <i>Rubus bicolor</i> , <i>Senecio madagascariensis</i> , <i>Sporobolus fertilis</i> , <i>Tradescantia fluminensis</i> , <i>Vinca major</i>
<i>Paralucia spinifera</i> (purple copper butterfly, Bathurst copper butterfly)	<i>Cytisus scoparius</i> , <i>Genista monspessulana</i> , <i>Rubus fruticosus</i> agg.
<i>Petalura gigantea</i> (giant dragonfly)	<i>Alnus glutinosa</i> , <i>Buddleja davidii</i> , <i>Crococsmia x crocosmiiflora</i> , <i>Cytisus scoparius</i> , <i>Erica lusitanica</i> , <i>Erigeron karvinskianus</i> , <i>Hypericum androsaemum</i> , <i>Hypericum kouytchense</i> , <i>Leycesteria formosa</i> , <i>Lonicera japonica</i> , <i>Pinus radiata</i> , <i>Rubus fruticosus</i> agg., <i>Salix cinerea</i>
<i>Petaurus australis</i> (yellow-bellied glider)	<i>Acetosa sagittata</i> , <i>Anredera cordifolia</i> , <i>Araujia sericifera</i> , <i>Asparagus asparagoides</i> , <i>Cardiospermum grandiflorum</i> , <i>Chloris gayana</i> , <i>Conyza</i> spp., <i>Ehrharta erecta</i> , <i>Eragrostis curvula</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Ochna serrulata</i> , <i>Paspalum dilatatum</i> , <i>Phyllostachys aurea</i> , <i>Rubus fruticosus</i> agg., <i>Sida rhombifolia</i> , <i>Solanum mauritianum</i> , <i>Tradescantia fluminensis</i>
<i>Petaurus norfolcensis</i> (squirrel glider)	<i>Asparagus asparagoides</i> , <i>Passiflora subpeltata</i> , <i>Senecio madagascariensis</i> , <i>Tradescantia fluminensis</i>

Biodiversity being protected by weed control programs in the HNCMA region	Weeds being controlled to protect the biodiversity at risk
<i>Pteropus poliocephalus</i> (grey-headed flying fox)	<i>Acer negundo</i> , <i>Ailanthus altissima</i> , <i>Alternanthera philoxeroides</i> , <i>Cardiospermum grandiflorum</i> , <i>Chloris gayana</i> , <i>Eragrostis curvula</i> , <i>Gleditsia triacanthos</i> , <i>Ludwigia peruviana</i> , <i>Salix</i> spp., <i>Salvinia molesta</i> , <i>Tradescantia fluminensis</i>
<i>Xanthomyza phrygia</i> (regent honeyeater)	<i>Acetosa sagittata</i> , <i>Anredera cordifolia</i> , <i>Araujia sericifera</i> , <i>Asparagus asparagoides</i> , <i>Cardiospermum grandiflorum</i> , <i>Chloris gayana</i> , <i>Ehrharta erecta</i> , <i>Eragrostis curvula</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Ochna serrulata</i> , <i>Paspalum dilatatum</i> , <i>Phyllostachys aurea</i> , <i>Rubus fruticosus</i> agg., <i>Sida rhombifolia</i> , <i>Tradescantia fluminensis</i>

Other

Ephemeral wetland	<i>Acetosa sagittata</i> , <i>Anredera cordifolia</i> , <i>Araujia sericifera</i> , <i>Asparagus asparagoides</i> , <i>Cardiospermum grandiflorum</i> , <i>Chloris gayana</i> , <i>Ehrharta erecta</i> , <i>Eragrostis curvula</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Ochna serrulata</i> , <i>Paspalum dilatatum</i> , <i>Phyllostachys aurea</i> , <i>Rubus fruticosus</i> agg., <i>Sida rhombifolia</i> , <i>Tradescantia fluminensis</i>
Shale Plains Woodland and Alluvial Woodland	<i>Acetosa sagittata</i> , <i>Ailanthus altissima</i> , <i>Anredera cordifolia</i> , <i>Araujia sericifera</i> , <i>Asparagus asparagoides</i> , <i>Cardiospermum grandiflorum</i> , <i>Chloris gayana</i> , <i>Cinnamomum camphora</i> , <i>Delairea odorata</i> , <i>Ehrharta erecta</i> , <i>Eragrostis curvula</i> , <i>Lantana camara</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Lonicera japonica</i> , <i>Macfadyena unguis-cati</i> , <i>Ochna serrulata</i> , <i>Paspalum dilatatum</i> , <i>Passiflora subpeltata</i> , <i>Phyllostachys aurea</i> , <i>Rubus fruticosus</i> agg., <i>Senecio madagascariensis</i> , <i>Sida rhombifolia</i> , <i>Tradescantia fluminensis</i>
Top of catchment	<i>Ailanthus altissima</i> , <i>Ligustrum sinense</i> , <i>Tradescantia fluminensis</i>
Wetland	<i>Lantana camara</i>
Wollondilly-Cox-Shoalhaven Gorge Woodlands and Riverbank Forest	<i>Echium plantagineum</i> , <i>Nassella trichotoma</i> , <i>Rubus fruticosus</i> agg.

Question 2 - What is the secondary aim of your control program at this site?

Of the 171 responses to this question, 28 (16%) listed biodiversity as their secondary aim, although for 24 weed programs the biodiversity they were trying to protect was not named. The most common secondary aim was legislation (61 responses or 36%) followed by containment (42 responses or 25%). As biodiversity conservation was the primary aim of 192 programs and a secondary aim of a further 28, this accounting for almost 90% of weed control programs surveyed.

C4.3.2 What is/are the target weed/s?

Responses to this question were provided in reference to 195 weed programs. The weed programs targeted 99 weeds in total with *Rubus fruticosus* agg. featuring in the greatest number of programs (99 responses or 51%), followed by *Ligustrum sinense* (59 responses or 30%), *Lonicera japonica* (57 or 29%), *Ligustrum lucidum* (52 or 27%), *Leycesteria formosa* (52 or 27%) and *Hypericum perforatum* (51 or 26%) (Table C12). Forty two of these 99 weeds are on the list of high priority widespread weeds in the HNCMA region (Table C4), a further 20 are on one of the region specific high priority widespread weed lists (Appendix C4) and the remaining 37 target weeds were not considered widespread, and thus not high priority within this project.

Table C12. Target weeds and number of weed programs currently being implemented for these weeds across the HNCMA region.

Scientific name (Common name)	No. of programs	%	High priority (Region wide)*	High priority (area specific) ^
<i>Acer negundo</i> (box-elder maple)	5	2.6		
<i>Acetosa sagittata</i> (rambling dock, turkey rhubarb)	12	6.2		
<i>Agapanthus praecox</i> (agapanthus)	3	1.5		
<i>Ageratina adenophora</i> (crofton weed)	31	15.9		
<i>Ageratina riparia</i> (mistflower)	1	0.5		
<i>Ailanthus altissima</i> (tree of heaven)	7	3.6		
<i>Alnus glutinosa</i> (black alder, common alder)	21	10.8		
<i>Alternanthera philoxeroides</i> (alligator weed)	6	3.1		
<i>Andropogon virginicus</i> (whiskey grass)	2	1.0		
<i>Anredera cordifolia</i> (Madeira vine)	32	16.4		
<i>Araujia sericifera</i> (moth vine)	7	3.6		
<i>Arundo donax</i> (Spanish reed, giant reed)	3	1.5		
<i>Asparagus asparagoides</i> (bridal creeper)	8	4.1		
<i>Axonopus fissifolius</i> (carpet grass)	1	0.5		
<i>Berberis aristata</i> (Nepal barberry)	1	0.5		
<i>Bryophyllum delagoense</i> (mother of millions)	1	0.5		
<i>Buddleja davidii</i> (buddleja, butterfly bush)	28	14.4		
<i>Cardiospermum grandiflorum</i> (balloon vine)	40	20.5		
<i>Celtis occidentalis</i> (American hackberry, celtis)	1	0.5		
<i>Cestrum parqui</i> (green cestrum)	8	4.1		
<i>Chloris gayana</i> (rhodes grass)	2	1.0		
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)	1	0.5		
<i>Cinnamomum camphora</i> (camphor laurel)	25	12.8		
<i>Cirsium vulgare</i> (spear thistle, black thistle)	1	0.5		
<i>Conyza</i> spp. (fleabane)	1	0.5		
<i>Coreopsis lanceolata</i> (coreopsis)	24	12.3		
<i>Cortaderia selloana</i> (pampas grass)	2	1.0		
<i>Cotoneaster</i> spp. (cotoneaster)	32	16.4		
<i>Crataegus monogyna</i> (hawthorn)	1	0.5		
<i>Crocasmia x crocosmiiflora</i> (monbretia)	1	0.5		
<i>Cytisus scoparius</i> (Scotch broom, English broom)	16	8.2		
<i>Delairea odorata</i> (Cape ivy)	26	13.3		
<i>Dietes</i> spp. (butterfly grass)	1	0.5		
<i>Echium plantagineum</i> (Paterson's curse)	2	1.0		
<i>Ehrharta erecta</i> (veldt grass)	4	2.1		
<i>Eichhornia crassipes</i> (water hyacinth)	1	0.5		
<i>Eragrostis curvula</i> (African lovegrass)	13	6.7		
<i>Erica lusitanica</i> (Spanish heath)	29	14.9		
<i>Erigeron karvinskianus</i> (seaside daisy)	21	10.8		

Scientific name (Common name)	No. of programs	%	High priority (Region wide)*	High priority (area specific) ^
<i>Genista monspessulana</i> (Montpellier broom, French broom)	43	22.1		
<i>Gleditsia triacanthos</i> (honey locust)	4	2.1		
<i>Gymnocoronis spilanthoides</i> (Senegal tea plant)	1	0.5		
<i>Hedera helix</i> (English ivy)	7	3.6		
<i>Hedychium gardnerianum</i> (ginger lily)	1	0.5		
<i>Hyparrhenia hirta</i> (Coolatai grass)	1	0.5		
<i>Hypericum androsaemum</i> (tutsan)	24	12.3		
<i>Hypericum perforatum</i> (St John's wort)	51	26.2		
<i>Ilex aquifolium</i> (English holly)	22	11.3		
<i>Ipomoea cairica</i> (coastal morning glory)	1	0.5		
<i>Ipomoea indica</i> (blue morning glory)	26	13.3		
<i>Ipomoea purpurea</i> (common morning glory)	1	0.5		
<i>Jasminum polyanthum</i> (jasmine)	24	12.3		
<i>Lantana camara</i> (lantana)	46	23.6		
<i>Leucanthamum x superbum</i> (leucanthamum)	2	1.0		
<i>Leycesteria formosa</i> (Himalayan honeysuckle)	52	26.7		
<i>Ligustrum lucidum</i> (large-leaved privet)	52	26.7		
<i>Ligustrum sinense</i> (small-leaved privet)	59	30.3		
<i>Lilium formosanum</i> (formosa lily)	1	0.5		
<i>Lonicera japonica</i> (Japanese honeysuckle)	57	29.2		
<i>Ludwigia longifolia</i> (long-leaved ludwigia)	1	0.5		
<i>Ludwigia peruviana</i> (ludwigia, Peruvian water primrose)	2	1.0		
<i>Ludwigia repens</i> (red ludwigia)	1	0.5		
<i>Lycium ferocissimum</i> (African boxthorn)	2	1.0		
<i>Macfadyena unguis-cati</i> (cat's paw creeper)	2	1.0		
<i>Myosotis discolor</i> (yellow and blue forget-me-not)	2	1.0		
<i>Nassella neesiana</i> (Chilean needle grass)	5	2.6		
<i>Nassella trichotoma</i> (serrated tussock)	9	4.6		
<i>Ochna serrulata</i> (Mickey Mouse plant)	3	1.5		
<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)	6	3.1		
<i>Opuntia</i> spp. (prickly pear, tiger pear)	2	1.0		
<i>Parietaria judaica</i> (asthma weed, pellitory)	1	0.5		
<i>Paspalum dilatatum</i> (paspalum)	5	2.6		
<i>Paspalum quadrifarium</i> (tussock paspalum)	1	0.5		
<i>Passiflora edulis</i> (black passionfruit)	1	0.5		
<i>Passiflora subpeltata</i> (white passionflower)	2	1.0		
<i>Photinia serratifolia</i> (Taiwanese photinia)	1	0.5		
<i>Phyllostachys aurea</i> (rhizomatous bamboo)	1	0.5		
<i>Pinus radiata</i> (radiata pine)	24	12.3		
<i>Prunus laurocerasus</i> (cherry laurel)	24	12.3		

Scientific name (Common name)	No. of programs	%	High priority (Region wide)*	High priority (area specific) ^
<i>Pueraria lobata</i> (kudzu)	1	0.5		
<i>Ranunculus repens</i> (creeping buttercup)	32	16.4		
<i>Ricinus communis</i> (castor oil plant)	2	1.0		
<i>Rosa rubiginosa</i> (sweet briar)	1	0.5		
<i>Rubus fruticosus</i> agg. (blackberry)	99	50.8		
<i>Salix</i> spp. (willow)	54	27.7		
<i>Salpichroa organifolia</i> (pampas lily of the valley)	1	0.5		
<i>Salvinia molesta</i> (salvinia)	3	1.5		
<i>Senecio madagascariensis</i> (fireweed)	3	1.5		
<i>Senna pendula</i> (cassia, winter senna)	2	1.0		
<i>Sida rhombifolia</i> (Paddy's lucerne)	5	2.6		
<i>Solanum mauritianum</i> (wild tobacco tree)	8	4.1		
<i>Solanum pseudocapsicum</i> (Madeira winter cherry)	1	0.5		
<i>Sporobolus fertilis</i> (giant Parramatta grass)	2	1.0		
<i>Tradescantia fluminensis</i> (trad)	39	20		
<i>Ulex europaeus</i> (gorse)	12	6.2		
<i>Vinca major</i> (blue periwinkle)	1	0.5		

* Weed species considered to be widespread and having a high impact on biodiversity at two or more of the workshops held in the HNCMA region.

^ Weed species considered to be widespread and having a high impact at just one of the workshops held in the HNCMA region.

C4.3.3 Funding

How is the program funded?

Of the 236 responses to this question, 168 (71%) weed programs were funded internally by the stakeholder. The remaining programs were either externally funded (13%) by HNCMA, Environmental Trust, Roads and Traffic Authority, National Heritage Trust or Bushland Conservation or were supported by both external and internal funds from mixed organisations (16%).

What was the budget for 06/07?

Responses to this question were provided for 219 weed programs. The most common budget range was \$1,000 to \$5,000 in the 2006/07 financial year, accounting for 101 (46%) programs (Table C13). Thirty-five (16%) weed control programs spent over \$20 000 in the 2006/07 financial year. The budgets provided for these 219 weed control programs translate to a total expenditure of between 1.6 and 2.55 million dollars in the 2006/07 financial year in the HNCMA region.

Table C13. Budget ranges for 219 weed control programs in the 2006/07 financial year and the number of weed control programs in each budget range.

Budget range for weed control programs in 2006/07	No. of programs	%
< \$500	4	2
\$500-\$1,000	13	6
\$1,000-\$5,000	101	46
\$5,000-\$10,000	26	12
\$10,000-\$15,000	23	10
\$15,000-\$20,000	17	8
\$20,000-\$25,000	11	5
\$25,000-\$30,000	12	6
\$30,000-\$35,000	7	3
\$35,000-\$40,000	5	2

C4.3.4 What control/restoration methods are used at this site?

Responses to this question were provided for 126 weed programs. The most common control methods used were herbicide and hand weeding, comprising 123 and 113 control programs respectively (Table C14). The responses were not mutually exclusive as respondents could provide multiple answers if they used more than one control method. Seventeen respondents chose the 'other' category when responding to this question. Other responses included revegetation, cut/paint, stem injection, stock removal, and soft engineering to reduce storm water impacts and erosion.

Table C14. Weed control methods used and number of control programs using each method.

Method/s used	Herbicide	Hand weeding	Mechanical	Biological control	Fire	Grazing	Other
No. of programs/sites	123	113	24	6	4	3	17

C4.3.5 Monitoring questions

Monitoring information was received for only 61 weed programs. Of these 36 included a monitoring component.

The response of weeds to control was the most common aspect monitored (24 programs or 67%) followed by the effectiveness of the control technique (22 programs or 61%). The response of native plants to control of weeds was only monitored in six weed programs despite 20 of the 36 programs that conducted monitoring stating that their primary aim was biodiversity conservation. This is consistent with results observed elsewhere (e.g. King and Downey 2008 for bitou bush).

The most popular monitoring techniques used were visual assessment (33 programs or 92%), mapping (29 programs or 81%) and species counts (20 programs or 55%). The responses were not mutually exclusive as respondents could provide multiple answers if they used more than one monitoring technique. Density/cover percentages, photopoints and quadrats/plots were used in a limited number of programs (7, 6 and 2 respectively), while transects were not used at all.

Out of the 36 weed programs that included a monitoring component, 18 used standardised internal data sheets. These 18 programs stored their monitoring data on the data sheets only and analysed the data for simple values such as percentages only. Twelve programs that did not use standardised data sheets stored data electronically but did not conduct any analyses.

C5. SPATIAL ANALYSIS

Out of the 330 sites nominated within the HNCMA region to 31 December 2008, 220 provided useable spatial data (e.g. in the form of GPS coordinates). These sites were compiled into a spatial layer to illustrate the location of nominated sites in relation to existing spatial information (e.g. boundaries and priority areas (e.g. corridors and threatened species locations)) within the HNCMA region. Of the remaining sites, 16 elected to keep the exact location details private for the purposes of this report and 94 did not provide a GPS location. This layer indicates the location of sites and the points generally represent the midpoint or entrance to a management site. The size of each site varies considerably (e.g. from 0.5 ha to 400 ha), which is not reflected in the spatial layer.

A series of maps have been created depicting the location of nominated sites with respect to: (i) differing land tenures, (ii) priority habitats, corridors and wetlands, (iii) threatened species recovery on the Cumberland Plain, (iv) assets of national environmental significance and (v) funded weed control programs within the HNCMA region.

C5.1 Sites and land tenure

The location of sites nominated to 31 December 2008 in relation to administrative and land tenure boundaries including Local Government Areas (LGAs), NPWS estate and State Forests as well as the major towns within the HNCMA region are depicted in Figure C1. NPWS land comprises a significant area of the HNCMA region. However, the breakdown of sites by land tenure shows a relatively even spread across tenures.

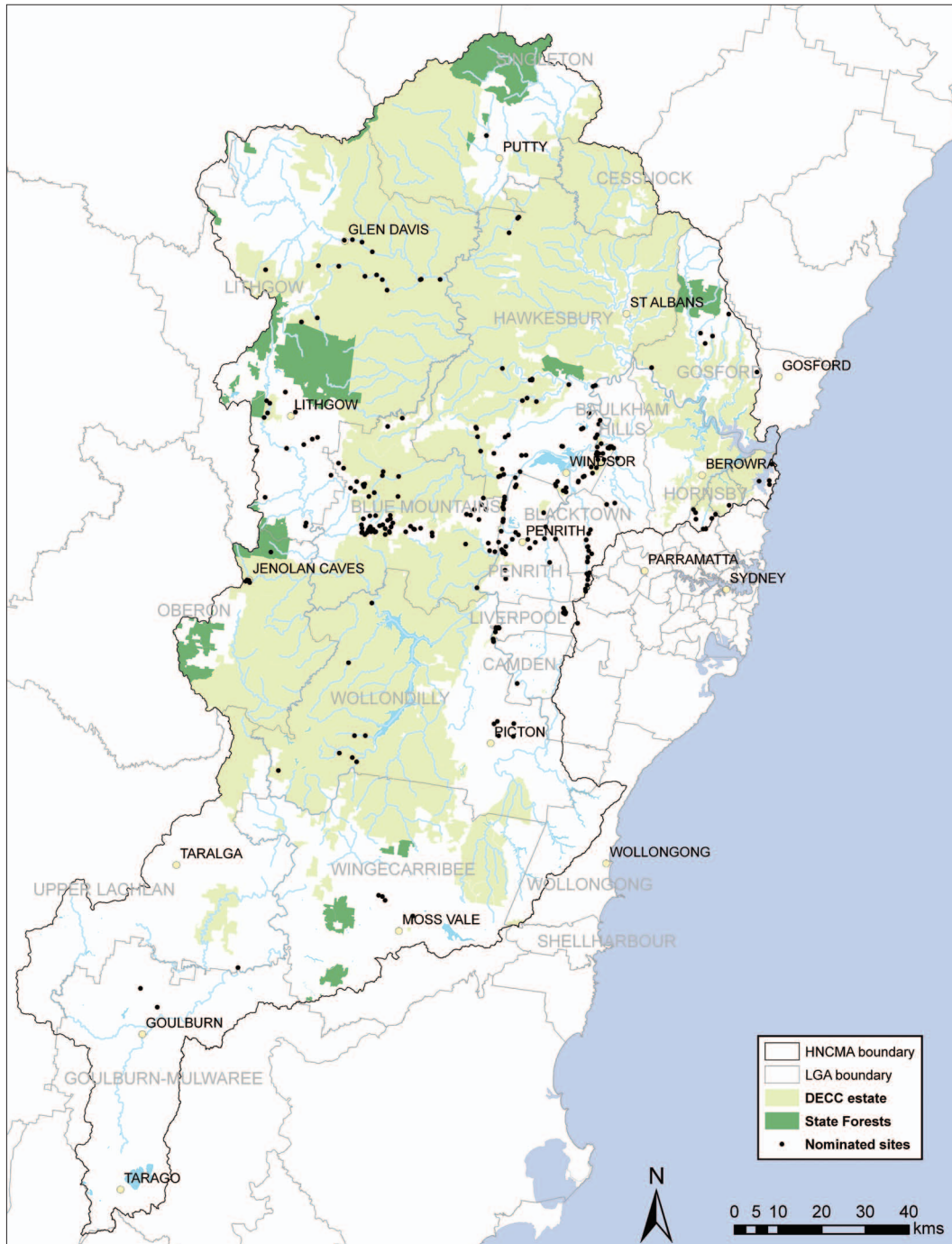


Figure C1. Nominated sites overlaid with Local Government areas, DECC (NPWS) estate and State Forests

C5.2 Priority habitats and corridors for threatened fauna in the HNCMA region

Areas of priority habitat and corridors have been identified and mapped for the HNCMA region (DECC 2007). Site nominations received for this project to 31 December 2008 have been overlaid with these priority areas. The location of 49 sites within priority habitat areas and two sites within priority corridors in the HNCMA region are presented in Figure C2. Details for each of these 51 sites are presented in Tables C15 and C16.

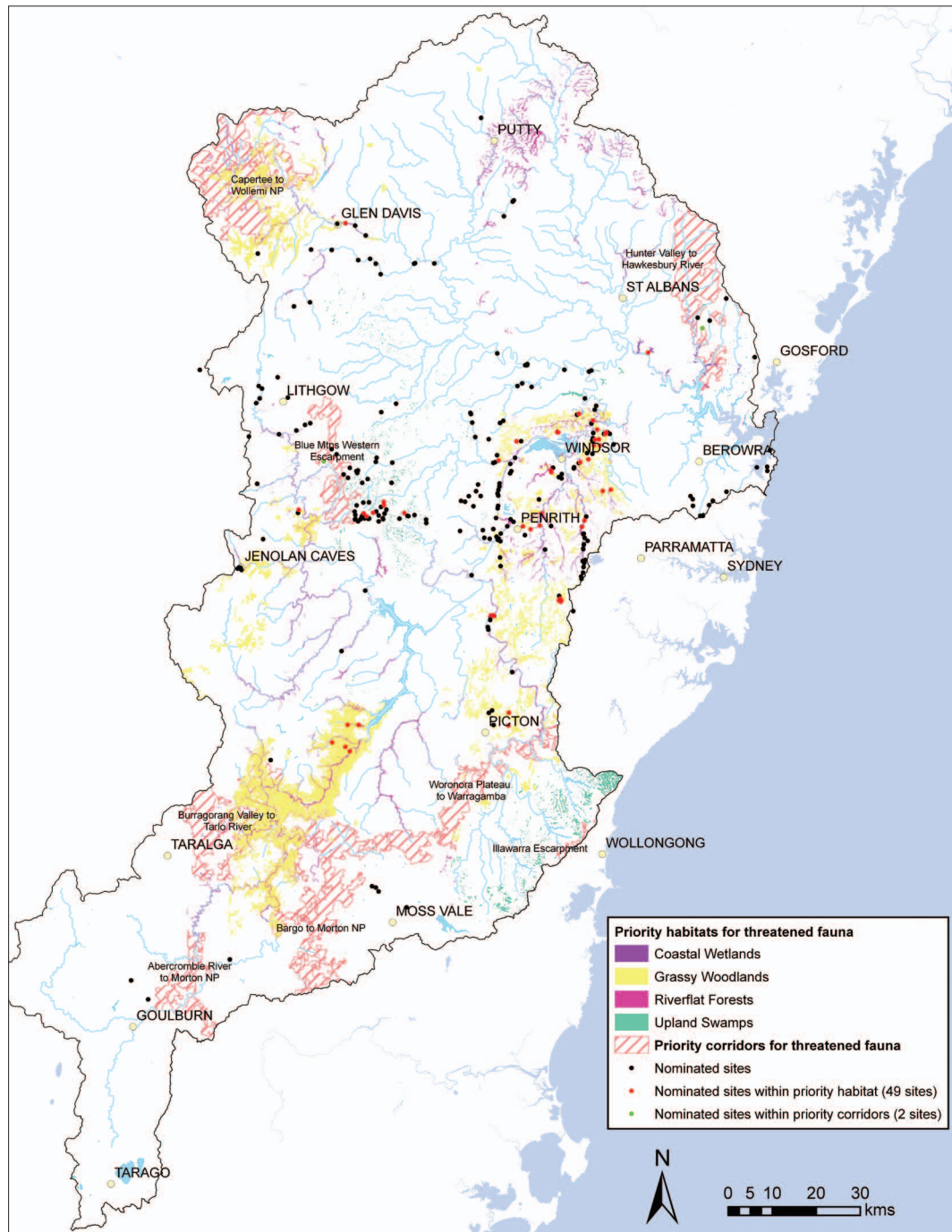


Figure C2. Nominated sites and priority habitats and corridors for threatened fauna (source: DECC 2007)

Table C15. The location of sites nominated to 31 December 2008 with respect to priority habitats as defined by DECCW (2007) (Appendix C5).

Site ID [^]	Habitat*	Category	Site name	Land manager
HN137	GW	1	Long Neck Lagoon, North Arm and adjacent woodland	DECCW
HN149	GW	1	Arndell's scrub, Cattai NP	DECCW
HN215	US	1	Leura Falls Creek	Council, DECCW, Private
HN167	GW	1	Shale/gravel transition Forest, Kemps Creek NR	DECCW
HN187	GW	1	Sawyers Reserve, Elizabeth Macarthur Agricultural Institute	LPMA
HN159	AF	1	<i>E. benthamii</i> sites, Bents Basin State Conservation Area	DECCW
HN184	GW	1	Barragal Lagoon Catchment, Elizabeth Macarthur Agricultural Institute	LPMA
HN134	GW	1	Long Neck Creek (North)	DECCW
HN147	GW	1	Melaleuca Track, Mitchell Park - Cattai NP	DECCW
HN45	GW	1	Chain of Ponds Reserve	Crown Land
HN105	US	1	Gordon Falls Creek	DECCW
HN142	GW	1	Pitt Town-Dural/Pebbly Hill Road	DECCW
HN185	GW	1	Menangle Pond Catchment, Elizabeth Macarthur Agricultural Institute	LPMA
HN70	GW	1	Woods Creek, Lower Grose	DECCW
HN305	GW	1	Kanangra Reserve	Council
HN 46	AF	1	Argyle Bailey Memorial Reserve/Swallow Rock Reserve	Crown Land
HN 48	GW	1	Redbank Creek Reserve	Council
HN141	GW	1	SNP - Old Pitt Town Road	DECCW
HN146	GW	1	Field Study Centre slope, Mitchell Park - Cattai NP	DECCW
HN168	GW	1	Cumberland Plain Woodland, Kemps Creek NR	DECCW
HN180	CW	1	Private property and Dharug National Park	Private, DECCW
HN186	GW	1	Riverine Forest, Elizabeth Macarthur Agricultural Institute	LPMA
HN200	US	1	Franks Creek swamps	Council/Private
HN210	US	1	Kittyhawk Swamp	Council
HN220	US	1	Wilson Park, North Lawson	Council
HN244	GW	1	Caddies Creek Park	Council
HN304	AF	1	Werrington Creek, Werrington between Victoria Road and Dunheved Road	Council, Private
HN312	GW	1	Pebbly Hill Road	Private
HN106	GW	2	Glen Davis	DECCW
HN36	AF	3	Precinct 1 Power - Quakers Hill	LPMA
HN39	AF	3	Powers - Richmond	LPMA
HN41	GW	3	Oakville Park	Council
HN42	GW	3	George Street Reserves	Council
HN43	GW	3	Freemans Reach Tennis Courts	LPMA
HN122	GW	3	Byrnes Creek	DECCW
HN123	GW	3	Joorilands River Upper	DECCW

Site ID [^]	Habitat*	Category	Site name	Land manager
HN124	GW	3	Joorilands River Lower	DECCW
HN125	GW/AF	3	Jooriland - Dry Creek	DECCW
HN126	GW	3	Jooriland - Ruin Precinct	DECCW
HN143	AF	3	Second Ponds Creek, Rouse Hill Regional Park	DECCW, RTA
HN148	AF	3	Cattai Creek, creekbank Mitchell Park - Cattai NP	DECCW
HN151	AF	3	Blue Box woodland, Wianamatta RP	Private
HN158	GW/AF	3	Riparian sites, Bents Basin State Conservation Area	DECCW
HN161	GW	3	Shale/sandstone transition forests, Bents Basin State Conservation Area	DECCW
HN155	GW	4	Floodway boundaries, Windsor Downs NR	DECCW
HN165	GW	4	Alluvial Woodlands, Kemps Creek NR	DECCW
HN205	US	4	Hester Creek Swamp	Council, Private
HN313	GW	4	Eagles Road	Private
HN19	GW	not ranked	Voluntary Conservation Agreement	Private

Site ID[^] = number allocated to a site during the site prioritisation process; Habitat* GW = grassy woodland, US = upland swamps, AF = alluvial forests and woodlands, CW = coastal wetlands, NP = National Park, NR = Nature Reserve.

DECCW is now known as Office of Environment & Heritage (OEH)

Table C16. The location of sites nominated to 31 December 2008 with respect to priority corridors, as defined by DECC (2007) (Appendix C5)

Site ID [^]	Corridor		Site name	Land manager
HN174	Hunter Valley to Hawkesbury River	1	Bedlam Creek	Crown, Private
HN9	Blue Mountains Western Escarpment	4	Willowvale Hill Paddock	Private

Site ID[^] = number allocated to a site during the site prioritisation process.

C5.3 Priority areas for threatened species recovery on the Cumberland Plain

Priority conservation areas for endemic flora of the Cumberland Plain have been identified for the HNCMA region (DECC 2008). Site nominations received for this project to 31 December 2008 have been overlaid with these areas. The location of 33 sites within the Cumberland Plain priority conservation areas are presented in Figure C3. The details of each of these sites are presented Table C17.

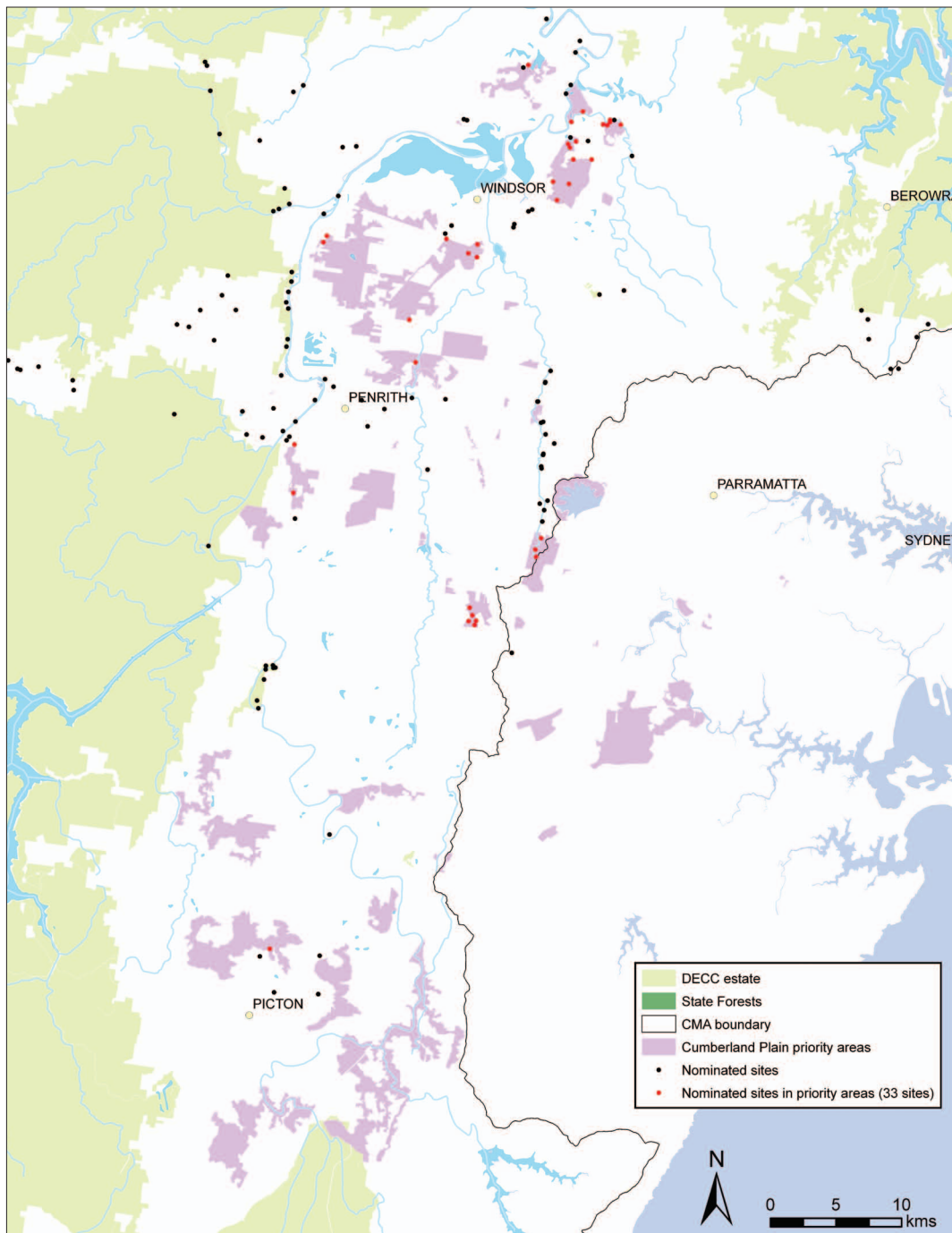


Figure C3. Nominated sites and Cumberland Plain Woodland priority areas (source: DECC 2008)

Table C17. Sites nominated to 31 December 2008 located within the Cumberland Plains Priority Areas (DECC 2008).

Site ID [^]	Category	Site name	Land manger
HN137	1	Long Neck Lagoon, North Arm and adjacent woodland	DECCW
HN140	1	Long Neck Lagoon (West bank)	DECCW
HN144	1	Cattai Creek Rainforest, Mitchell Park - Cattai NP	DECCW
HN132	1	Agnes Banks NR reserve edge and track	DECCW, Council, Crown
HN149	1	Arndell's scrub, Cattai NP	DECCW
HN133	1	Agnes Banks NR northern addition	DECCW
HN167	1	Shale/gravel transition Forest, Kemps Creek NR	DECCW
HN134	1	Long Neck Creek (North)	DECCW
HN147	1	Melaleuca Track, Mitchell Park - Cattai NP	DECCW
HN45	1	Chain of Ponds Reserve	Crown Land
HN142	1	Pitt Town-Dural, Pebbly Hill Road	DECCW
HN31	1	Moonrise West	DECCW
HN32	1	SIEC	LPMA
HN136	1	Old Pitt Town, Schofield Road	DECCW
HN141	1	SNP - Old Pitt Town Road	DECCW
HN146	1	Field Study Centre slope, Mitchell Park - Cattai NP	DECCW
HN153	1	Small southern creek, Castlereagh NR	DECCW
HN168	1	Cumberland Plain Woodland, Kemps Creek NR	DECCW
HN139	3	Long Neck Lagoon (South East banks)	DECCW
HN145	3	Top Gate, Mitchell Park - Cattai NP	DECCW
HN148	3	Cattai Creek, creekbank Mitchell Park - Cattai NP	DECCW
HN151	3	Blue Box woodland, Wianamatta	Private
HN157	3	Northern extension, Windsor Downs NR	DECCW
HN166	3	Castlereagh Swamp woodlands, Kemps Creek NR	DECCW
HN171	3	Regentville precinct, Mulgoa NR	DECCW
HN321	3	Private property	Private
HN135	4	Long Neck Creek (south)	DECCW
HN150	4	Orchard Flat, Cattai NP	DECCW
HN154	4	Hakea Paddock, Windsor Downs NR	DECCW
HN155	4	Floodway boundaries, Windsor Downs NR	DECCW
HN156	4	The Dam, Windsor Downs NR	DECCW
HN165	4	Alluvial Woodlands, Kemps Creek NR	DECCW
HN311	4	Rotherwood Road	Private

Site ID[^] = number allocated to a site during the site prioritisation process; NP = National Park, NR = Nature Reserve. DECCW is now known as Office of Environment & Heritage (OEH).

C5.4 Assets of national environmental significance

Spatial data is available for threatened ecological communities listed under the EPBC Act, in addition to nationally important wetlands. The locations of 48 sites nominated to 31 December 2008 within eight EPBC listed threatened ecological communities are presented in Figure C4. The details each of these sites is presented in Table C18.

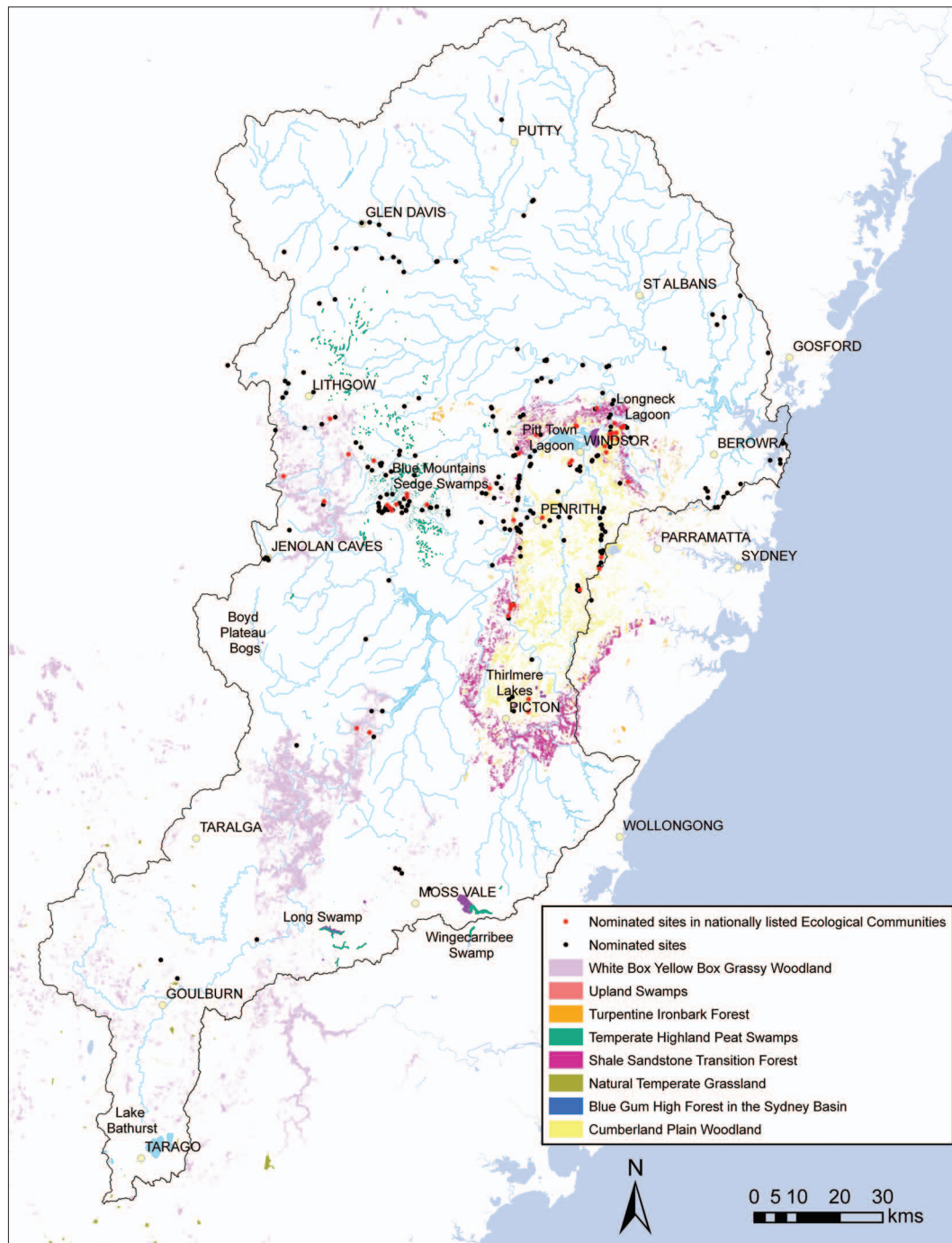


Figure C4. Nominated sites and national significant vegetation and wetlands (source: Department of Environment, Water, Heritage & the Arts)

Table C18. Sites nominated to 31 December 2008 located within EPBC listed threatened ecological communities in the HNCMA region.

Site ID [^]	EEC*	Category	Site name	Land manager
HN137	CPW	1	Long Neck Lagoon, North Arm and adjacent woodland	DECCW
HN140	CPW	1	Long Neck Lagoon (West Bank)	DECCW
HN149	SSTF	1	Arndell's scrub, Cattai NP	DECCW
HN215	THPS	1	Leura Falls Creek	Council, DECCW, Private
HN164	SSTF	1	Plateau, Gulguer NR	DECCW
HN187	CPW	1	Sawyers Reserve, Elizabeth Macarthur Agricultural Institute	LPMA
HN184	CPW	1	Barragal Lagoon Catchment, Elizabeth Macarthur Agricultural Institute	LPMA
HN45	SSTF	1	Chain of Ponds Reserve	Crown Land
HN134	CPW	1	Long Neck Creek (North)	DECCW
HN147	SSTF	1	Melaleuca Track, Mitchell Park - Cattai NP	DECCW
HN162	SSTF	1	Eastern boundary, Gulguer NR	DECCW
HN105	THPS	1	Gordon Falls Creek	DECCW
HN142	CPW	1	Pitt Town-Dural, Pebbly Hill Road	DECCW
HN185	CPW	1	Menangle Pond Catchment, Elizabeth Macarthur Agricultural Institute	LPMA
HN70	SSTF	1	Woods Creek, Lower Grose	DECCW
HN305	CPW	1	Kanangra Reserve	PCC
HN10	WBYB	1	Woodey	Private
HN31	CPW	1	Moonrise West	DECCW
HN48	CPW	1	Redbank Creek Reserve	Council
HN136	CPW	1	Old Pitt Town, Schofield Road	DECCW
HN141	CPW	1	SNP - Old Pitt Town Road	DECCW
HN146	SSTF	1	Field Study Centre slope, Mitchell Park - Cattai NP	DECCW
HN168	CPW	1	Cumberland Plain Woodland, Kemps Creek NR	DECCW
HN186	CPW	1	Riverine Forest, Elizabeth Macarthur Agricultural Institute	LPMA
HN200	THPS	1	Franks Creek swamps	Council, Private
HN210	THPS	1	Kittyhawk Swamp	Council
HN211	SSTF	1	Knapsack Park, Knapsack Reserve	Council
HN220	THPS	1	Wilson Park, North Lawson	Council
HN228	THPS	1	Upper Hat Hill Creek	Council
HN244	SSTF	1	Caddies Creek Park	Council
HN312	CPW	1	Pebble Hill Road	Private
HN55	WBYB	2	Hyde Park, Hartley (River Lett Subcatchment)	Crown Land
HN33	CPW	3	Precinct 6 Horsley Park	LPMA
HN42	CPW	3	George Street Reserves	Council
HN43	CPW	3	Freemans Reach Tennis Courts	Crown Land

HN124	WBYB	3	Joorilands River Lower	DECCW
HN125	WBYB	3	Jooriland - Dry Creek	DECCW
HN139	SSTF	3	Long Neck Lagoon (South East banks)	DECCW
HN145	SSTF	3	Top Gate, Mitchell Park - Cattai NP	DECCW
HN148	SSTF	3	Cattai Creek, creekbank Mitchell Park - Cattai NP	DECCW
HN160	CPW	3	Cumberland Plain Woodland, Bents Basin State Conservation Area	DECCW
HN161	SSTF	3	Shale/sandstone transition forests around the Basin, Bents Basin State Conservation Area	DECCW
HN216	SSTF	3	Linksvie Avenue Landcare Group	Council, Private
HN9	WBYB	4	Willowvale Hill Paddock	Private
HN102	THPS	4	Links Road, Leura	DECCW
HN205	THPS	4	Hester Creek Swamp	Council, Private
HN313	CPW	4	Eagles Road	Private
HN19	WBYB	not ranked	Voluntary Conservation Agreement	Private

Site ID* = number allocated to a site during the site prioritisation process.

EPBC listed EEC*s (Endangered Ecological Community); CPW = Cumberland Plain Woodland, SSTF = Shale Sandstone Transition Forest, THPS = Temperate Highland Peat Swamps on Sandstone, WBYB = White Box/Yellow Box/Blakely's Red Gum Grassy Woodland, NP = National Park, NR = Nature Reserve.

DECCW is now known as Office of Environment & Heritage (OEH).

C5.5 Recent weed programs/activities funded by HNCMA

Spatial data detailing the location of weed activities funded during 2001–2004 and 2005–2008 was provided by HNCMA. The locations of 15 sites nominated to 31 December 2008 that overlapped with previously funded weed activities in the HNCMA region are presented in Figure C5. The site numbers, site names and tenures of each of the sites is presented in Table C19.

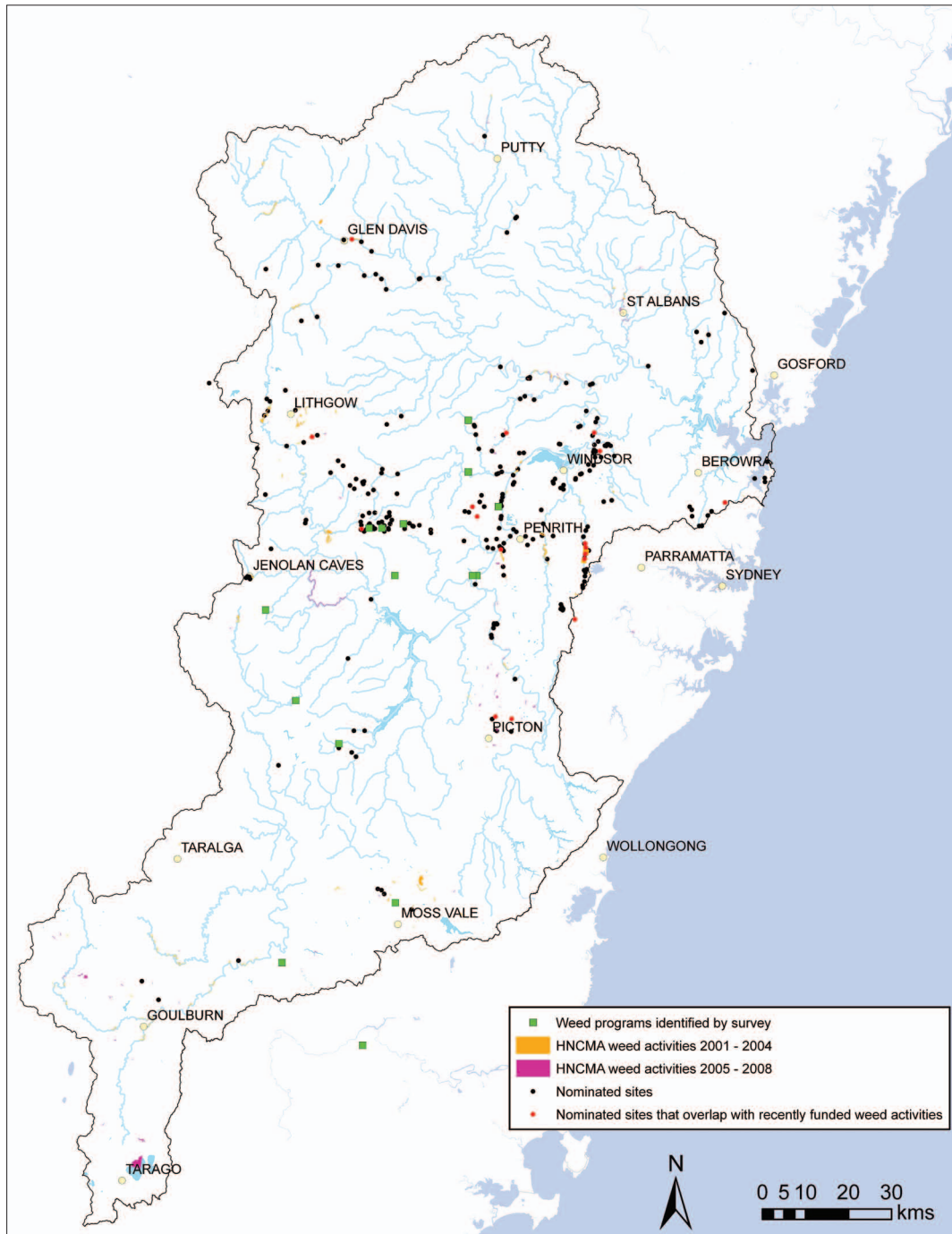


Figure C5. Nominated sites that overlap with recently funded weed programs in the Hawkesbury-Nepean CMA region (source: HNCMA)

Table C19. sites nominated to 31 December 2008 that overlap with previous weed management activities funded by HNCMA.

Site ID [^]	Category	Site name	Land manager
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Funded by the HNCMA over the period 2005–2008

HN227	1	Sun Valley Reserve, private lands	Private/Council
HN328	1	Dundundra Falls Reserve	Crown
HN46	1	Argyle Bailey Memorial Reserve/Swalloe Rock Reserve	Crown/Council
HN209	1	Katoomba Falls Reserve	Council
HN312	1	Pebbly Hill Road	Private
HN216	3	Linksview Avenue Landcare Group	Private/Council
HN313	4	Eagles Road	Private
HN311	4	Rotherwood Road	Private
HN316	4	West Hoxton	Private

Funded by the HNCMA over the period 2001–2004

HN35	1	Precinct 2 Bungarribee-Rooty Hill	LPMA
HN55	2	Hyde Park, Hartley (River Lett Subcatchment)	Crown Land
HN106	2	Glen Davis	DECCW
HN34	3	Precinct 3 Dragway	LPMA
HN44	3	Mill Road Reserve	Crown Land
HN320	3	Graham Windridge property	Private

Site ID[^] = number allocated to a site during the site prioritisation process.

DECCW is now known as Office of Environment & Heritage (OEH).

C6. SUMMARY FOR HAWKESBURY-NEPEAN 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.

C6.1 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 HNCMA region, can also be used to meet a range of CMA priorities. This project directly addresses the HNCMA CAP targets as outlined in Section C2.1, 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 HNCMA. 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).

C6.2 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 HNCMA 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 fauna species not currently captured in the PAS.

Detailed monitoring that specifically assesses the potential reduction in impact of widespread weeds in the HNCMA 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*).

C6.3 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 HNCMA region. As conditions or management requirements change at existing sites, and as information on new sites becomes available, they can be included in the HNCMA 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 HNCMA contained site nominations received before December 2008. Any site nominations received during 2009 and up until 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 the HNCMA for inclusion in the site spreadsheet and sites should subsequently be re-ranked by HNCMA.

The list of priority sites will be kept by HNCMA 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.

C7. REFERENCES

- Coutts-Smith, AJ and Downey, PO 2006. *Impact of weeds on threatened biodiversity in NSW*. Technical Series 11. Cooperative Research Centre for Australian Weed Management, Adelaide.
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- Randall, R 2000. 'Which are my worst weeds?' A simple ranking system for prioritising weeds'. *Plant Protection Quarterly* 15:109-115.
- Thorp, JR and Lynch, R 2000. *The Determination of Weeds of National Significance*. National Weeds Strategy Executive Committee, Launceston.

C8. APPENDICES

Appendix C1: Current actions in the Priorities Action Statement (PAS) relating to weed management in the HNCMA region

Appendix C2: Attendees at HNCMA weed impacts to biodiversity workshops

Appendix C3: All weeds considered at workshops in HNCMA region, their distribution and their relative impact on biodiversity

Appendix C4: Priority widespread weeds impacting on biodiversity in the HNCMA region sorted by area

Appendix C5: Priority habitats and corridors for threatened fauna in the HNCMA region

Appendix C6: Template of letter sent to private landholders with voluntary conservation agreements or wildlife refuges on their properties

Appendix C7: Weed program survey

**APPENDIX C1.
CURRENT ACTIONS IN THE PRIORITIES ACTION STATEMENT (PAS)
RELATING TO WEED MANAGEMENT IN THE HNCMA REGION**

Threatened species, populations and communities	Type of species	Level of threat	Priority actions in PAS relating to weed management
High priority			
<i>Acacia clunies-rossiae</i>	Shrubs	V	Develop and implement weed control and monitoring programs along the Kowmung River.
Blue Gum High Forest	Threatened Ecological Communities	E	Undertake priority weed control works.
<i>Chamaesyce psammogeton</i>	Herbs and Forbs	E	Undertake bitou bush/boneseed control; giving priority to sites identified in the TAP.
<i>Cynanchum elegans</i>	Epiphytes and climbers	E	Undertake weed control using DEC guidelines for bush regeneration activities. Implement bitou bush control as described in the approved TAP.
<i>Darwinia glaucophylla</i>	Shrubs	V	Undertake weed control; priority given to sites at urban interface.
<i>Eucalyptus camfieldii</i>	Mallees	V	Undertake identified priority weed control; e.g. Stewart Ave Hornsby.
<i>Eulamprus leuraensis</i>	Reptiles	E	Control invasion of Pinus species into sites within or adjoining Newnes SF and control weeds at sites adjoining urban areas or impacted by runoff from the Great Western Highway.
<i>Galium australe</i>	Herbs and Forbs	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.
<i>Gentiana wingecarribiensis</i>	Herbs and Forbs	E	1. Continue woody weed control in Wingecarribee Swamp. 2. Control exotic pasture grass invasion of species habitat on margins of Wingecarribee Swamp.
<i>Grevillea caleyi</i>	Shrubs	E	Implement weed control and bush regeneration across sites identified in the recovery plan for the species.
<i>Hibbertia procumbens</i>	Shrubs	E	Undertake targeted bush regeneration works; where required.
<i>Keraudrenia corrolata</i> var. <i>denticulata</i> - endangered population	Endangered Populations	E	Remove weeds and control further spread.
<i>Lepidosperma evansianum</i>	Herbs and Forbs	V	Implement targeted weed control programs (may tie in with Microstrobos weed control).
Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Threatened Ecological Communities	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>	Herbs and Forbs	E	Continue woody weed control in Wingecarribee Swamp and Burrumbowlie Swamp.
<i>Microstrobos fitzgeraldii</i>	Shrubs	E	Implement targeted weed control programs at known sites where necessary.
<i>Microtis angusii</i>	Orchids	E	Pest management and weed assessment and management trials will be undertaken.
<i>Miniopterus schreibersii oceanensis</i>	Bats	V	Undertake non-chemical removal of weeds (e.g. lantana; blackberry) to prevent obstruction of cave entrances.
<i>Olearia cordata</i>	Shrubs	V	Undertake necessary weed control; priority site Wisemans Ferry Historic Site.

Threatened species, populations and communities	Type of species	Level of threat	Priority actions in PAS relating to weed management
<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>Persoonia mollis</i> subsp. <i>maxima</i>	Shrubs	E	Undertake weed management in Cockle Creek; Calna Creek and Berowara Creek catchments.
<i>Petalura gigantea</i>	Invertebrates	E	Control invasion of Pinus 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>Pilularia novae-hollandiae</i>	Ferns and Cycads	E	Remove exotic species such as <i>Plantago lanceolata</i> ; <i>Cyperus tenellus</i> ; <i>Bromus hordeaceus</i> and <i>Lilaea scilloides</i> in areas of known or likely habitat.
<i>Prasophyllum fuscum</i>	Orchids	V	1. Continue woody weed control in Wingecarribee Swamp. 2. Control exotic pasture grass invasion of species habitat on margins of Wingecarribee Swamp.
<i>Prasophyllum uroglossum</i>	Orchids	E	1. Attempt to control exotic pasture grass invasion of species habitat on margins of Wingecarribee Swamp. 2. Continue woody weed control in Wingecarribee Swamp.
<i>Prostanthera stricta</i>	Shrubs	V	Undertake priority weed control especially at Stockyard Point Mt Vincent; Genowlan Mt; Eagal View Mt Vincent; SE Mt Ida.
Sun Valley Cabbage Gum Forest in the Sydney Basin Bioregion	Threatened Ecological Communities	E	Actively control weeds in EEC remnants using bush regeneration techniques.
White Box Yellow Box Blakely's Red Gum Woodland	Threatened Ecological Communities	E	Target priority weeds for control.

Medium priority

<i>Acacia baueri</i> subsp. <i>aspera</i>	Shrubs	V	Undertake targeted bush regeneration works; where required.
<i>Acacia bynoeana</i>	Shrubs	E	Undertake targeted bush regeneration works; where required.
<i>Acacia gordonii</i>	Shrubs	E	Undertake targeted bush regeneration works; where required.
Agnes Banks Woodland in the Sydney Basin Bioregion	Threatened Ecological Communities	E	Ensure the consideration of impacts on EECs when enforcing noxious weed or pest species control in EECs.
<i>Asterolasia elegans</i>	Shrubs	E	Undertake targeted bush regeneration works; where required; incl. along Loughtondale Gully Road (Hornsby LGA).
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion	Threatened Ecological Communities	E	Actively control weeds using bush regeneration techniques.
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Threatened Ecological Communities	E	Undertake weed control for Bitou Bush and Boneseed at priority sites in accordance with the approved Threat Abatement Plan.
<i>Dillwynia tenuifolia</i> – endangered population Kemps Creek	Endangered Populations	E	Conduct weed removal and rehabilitation targeting localised occurrences of highly invasive weed species such as Privet; Honeysuckle; Castor Oil Plant; Pampas Grass; Wild Tobacco and <i>Eragrostis curvula</i> .
<i>Eucalyptus benthamii</i>	Trees	V	Prepare and implement provisions in habitat management plans to control weeds.
<i>Euphrasia bowdeniae</i>	Herbs and Forbs	V	Undertake targeted bush regeneration works; where required.

Threatened species, populations and communities	Type of species	Level of threat	Priority actions in PAS relating to weed management
Genowlan Point <i>Allocasuarina nana</i> Heathland	Threatened Ecological Communities	E	Undertake targeted bush regeneration works where required to control weeds.
<i>Grevillea parviflora</i> subsp. <i>supplicans</i>	Shrubs	E	Undertake targeted bush regeneration works; where required.
<i>Gyrostemon thesioides</i>	Shrubs	E	Perform weeding at sites where determined necessary.
<i>Leptospermum deanei</i>	Shrubs	V	Conduct weed control where necessary.
<i>Melaleuca biconvexa</i>	Trees	V	Undertake targeted bush regeneration works; where required.
<i>Melaleuca deanei</i>	Shrubs	V	Undertake targeted bush regeneration works; where required.
<i>Meridolum corneovirens</i>	Invertebrates	E	Implement weed control at sites where necessary.
O'Hares Creek Shale Forest	Threatened Ecological Communities	E	Undertake targeted bush regeneration work to restore and maintain remnants.
<i>Persoonia bargoensis</i>	Shrubs	E	Undertake targeted bush regeneration works and weed control; where required.
<i>Persoonia hirsuta</i>	Shrubs	E	Undertake targeted bush regeneration works and weed control; where required.
<i>Pimelea curviflora</i> var. <i>curviflora</i>	Shrubs	V	Conduct weed management; particularly at populations near land used for agriculture.
Pittwater Spotted Gum Forest	Threatened Ecological Communities	E	Undertake priority weed control.
<i>Pomaderris adnata</i>	Shrubs	E	Undertake weed control in accordance with site management statement.
<i>Potorous tridactylus</i>	Marsupials	V	Control weeds; particularly those that affect the understorey layer; in Long-nosed Potoroo habitat.
<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.
<i>Prostanthera junonis</i>	Shrubs	E	Undertake weed control activities as appropriate using approved bush regeneration methods.
<i>Pterostylis saxicola</i>	Orchids	E	Undertake targeted bush regeneration works; where required.
<i>Ptilinopus superbus</i>	Birds	V	Undertake weed control in and adjacent to littoral rainforest to augment Fruit-dove habitat.
<i>Pultenaea glabra</i>	Shrubs	V	1. Prevent runoff from residential areas into known habitat for this species. 2. Undertake appropriate weed control activities where necessary.
<i>Rutidosis leptorrhynchoides</i>	Herbs and Forbs	E	Control weeds at Gundry TSR.
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	Threatened Ecological Communities	E	Undertake weed control for Bitou Bush and Boneseed at priority sites in accordance with the approved Threat Abatement Plan and associated PAS actions.
Swamp Sclerophyll Forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Threatened Ecological Communities	E	Undertake weed control for Bitou Bush and Boneseed at priority sites in accordance with the approved Threat Abatement Plan and associated PAS actions.

Threatened species, populations and communities	Type of species	Level of threat	Priority actions in PAS relating to weed management
<i>Syconycteris australis</i>	Bats	V	Control coastal weed species e.g. 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.
<i>Tetratheca juncea</i>	Shrubs	V	Undertake weed control activities as appropriate using approved bush regeneration methods at priority sites on private and public land.
<i>Themeda australis</i>	Threatened Ecological Communities	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>	Herbs and Forbs	V	Implement bitou bush control as described in the approved TAP.
<i>Trachymene saniculifolia</i>	Herbs and Forbs	E	Undertake targeted bush regeneration works; where required.

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

V = listed as vulnerable under the TSC Act

E = listed as endangered under the TSC Act

**APPENDIX C2.
ATTENDEES AT HNCMA WEED IMPACTS TO BIODIVERSITY
WORKSHOPS**

Name	Organisation	Position
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Tuesday 12 February 2008 at Windsor

Michelle Engelhard	Hawkesbury City Council	Land Management Officer
Tanya Leary	DECCW - Sydney Region	Biodiversity Officer
Tegan Burton	DECCW - Lower Hawkesbury Area	Ranger
Linda Hanlon	HNCMA - Windsor	Catchment Officer - River Restoration Program
Alex Muir	HNCMA - Windsor	Community Support Officer (Landcare)
Janet Rannard	Penrith City Council	Bushland Management Officer
Rob Gleeson	Ku-ring-gai Council	Team Leader (Pest Species)
Dominic Edmonds	Ku-ring-gai Council	Bushland Maintenance Supervisor
Robert Meyer	HNCMA - Windsor	Weeds Officer
Bill Dixon	HNCMA - Windsor	
Fluer Nash	DECCW - Cumberland South Area	Acting Ranger
Rebecca Coventry	I&I NSW	HN Aquatic Weeds Technical Officer
Jonathan Sanders	DECCW - Cumberland North Area	Area Manager
Paul Godfrey	DECCW - Hawkesbury Area	Area Manager
Vickii Lett	DECCW - Hawkesbury Area	Administrative Officer
Chad Weston	Forests NSW - Cumberland	Ranger

Wednesday 13 February 2008 at Katoomba

Chris Banffy	DECCW - Blue Mountains Region	Senior Ranger Pest Management
Lyndal Sullivan	Blue Mountains Conservation Society	
Wyn Jones		Ecologist
Hugh Patterson		Bush Regenerator
Linda Thomas	Blue Mountains City Council	Extension Officer Weeds
Frances Laurenson	CMA - Lithgow	Catchment Officer (River Health)
Tiffany Mason	DECCW - Lithgow	Threatened Species Officer
Chris Dewhurst	Blue Mountains City Council	Weed Management Coordinator
Trevor Flewin	HNCMA - Lithgow	Catchment Officer (River Restoration)
Eric Mahony	Blue Mountains City Council	Bushland Management Officer
Vera O'Donovan	DECCW - Upper Mountains Area	Ranger
Jules Bros	DECCW - Kanangra Area	Ranger
Glenn Meade	DECCW - Blue Mountains Region	Regional Operations Manager Blue Mountains

Wednesday 20 February 2008 at Picton

Alexandra Stengl	Wollondilly Shire Council	Environmental Officer
Peter Cuneo	DECCW - Mount Annan Botanic Gardens	Manager Natural Heritage
James Killen	Western Sydney Parklands Trust	Senior Ranger
Joel Daniels	Liverpool Council	Weeds and Waterways Officer
Belinda Rollason	Western Sydney Parklands Trust	
Adam Bryce	Western Sydney Parklands Trust	Ranger

Name	Organisation	Position
Gary Popple	Muru Mittigar	
Roger Giles	Barragal Landcare Group	President
Julie Sheppard	Razorback Landcare Group	Convenor
Peter Gorham	I&I NSW (South Region)	

Thursday 21 February 2008 at Goulburn

John Reynolds	HNCMA - Goulburn	Catchment Officer - Bushland Conservation
Joanna Willmott	HNCMA - Goulburn	Catchment Officer - River Health
Paul Brown	Upper Lachlan Council	Noxious Weeds Officer
Trish Densmore	HNCMA - Goulburn	Catchment Officer - Bushland Conservation
Angie Mooney	HNCMA - Goulburn	Catchment Officer
Scott Craig	Livestock Health and Pest Authorities	Ranger
Malcolm Ross	Goulburn Mulwaree Council	
Robert Brooks	Goulburn Mulwaree Council	Noxious Weeds Officer
Michael Pattinson	Wetlandcare Australia	
Bronwen Wicks	I&I NSW	Serrated Tussock National Coordinator
Mich Michelmore	I&I NSW	Regional Weed Control Coordinator

Tuesday 15 April 2008 at Lithgow

Boris Hunt	Lithgow Oberon Landcare	Chair
Peter Evans	HNCMA - Lithgow	Community Support Officer
Geroge Quinell	Lithgow Community Nursery	Chair
Eric Mahony	Blue Mountains City Council	Bushland Management Officer
Sue Graves	Lithgow Oberon Landcare	Secretary
David Durie	Lithgow Council	Environmental Health Officer
Frances Laursen	HNCMA - Lithgow	River Health Officer
Jenene Kidston	I&I NSW	District Agronomist

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 C3.

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

Table C20. Primary list of weeds considered at workshops in HNCMA region.

Primary weeds considered at workshops	Windsor		Katoomba		Picton		Goulburn		Lithgow	
	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²
<i>Acacia saligna</i> (golden wreath wattle, orange wattle, blue-leafed wattle)	W	VH	E		E		L			
<i>Acer negundo</i> (box-elder maple)	W	VH	W	H	W	H	NP			
<i>Acetosa sagittata</i> (rambling dock, turkey rhubarb)	W	H	W	L	W	M	NP			
<i>Ageratina adenophora</i> (crofton weed)	W	H	W	H	W	M	NP			
<i>Ageratina riparia</i> (mistflower, creeping Crofton Weed)	W	H	W	H	E		NP			
<i>Ailanthus altissima</i> (tree of heaven)	W	VH	W	H	W	L	L			
<i>Alternanthera philoxeroides</i> (alligator weed)	W	VH	L		W	H	A			
<i>Ambrosia artemisiifolia</i> (annual ragweed)	?		L		L		W	M		
<i>Ammi majus</i> (bishop's weed, bullwort)	E		NP		L		?			
<i>Andropogon virginicus</i> (whiskey grass/broom sedge)	W	M	W	M	W	M	E			
<i>Anredera cordifolia</i> (Madeira vine, lamb's tail, jalap, potato vine)	W	VH	W	H	W	M	NP			
<i>Anthoxanthum odoratum</i> (sweet vernal grass)	L		W	H	?		L			
<i>Aptenia cordifolia</i> (baby sun rose, heartleaf ice plant)	NP?		NP		?		NP			
<i>Araujia sericifera</i> (moth vine/mothplant)	W	H	W	M	W	M	NP			
<i>Arctotheca calendula</i> (Capeweed, Cape dandelion)	W	L	L		W	L	W	M		
<i>Asparagus aethiopicus</i> (asparagus fern, sprengeri fern)	W	VH	W	M	W	L	L			
<i>Asparagus asparagoides</i> (bridal creeper, florist's smilax)	W	VH	W	H	W	H	L			
<i>Asparagus plumosus</i> (climbing asparagus fern)	W	M	L		W	L	NP			
<i>Aster subulatus</i> (wild aster, bushy starwort, aster weed)	L		W	L	?		?			
<i>Avena sativa</i> (oats)	L		W	L	L		W	L		
<i>Axonopus fissifolius</i> (narrow-leaved carpet grass)	W	L	W	M	W	L	?			
<i>Bidens pilosa</i> (cobblers pegs, farmers friends, sticky pegs)	W	L	W	L	W	L	E		W	M
<i>Briza maxima</i> (quaking grass, giant shivery grass)	L		W	L	W	L	W	L		
<i>Briza minor</i> (shivery grass, small shivery grass, quaking grass)	L		W	L	W	L	W	L		
<i>Bromus diandrus</i> (great brome)	L		L		?		?			
<i>Bryophyllum delagoense</i> (mother of millions)	W	H	E		W	H	NP			
<i>Cardiospermum grandiflorum</i> (balloon vine)	W	H	W	H	W	H	A			

Primary weeds considered at workshops	Windsor		Katoomba		Picton		Goulburn		Lithgow	
Scientific name (Common name)	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²
<i>Cenchrus incertus</i> (spiny burr grass)	L		W	L	NP		L			
<i>Chloris gayana</i> (rhodes grass)	W	M	W	H	W	H	L			
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> (bitou bush)	L		NP		L		NP			
<i>Cinnamomum camphora</i> (camphor laurel)	W	M	W	M	W	H	L			
<i>Cirsium vulgare</i> (spear, black, Scotch thistle)	W	L	W	L	W	L	W	L		
<i>Conyza</i> spp. (fleabane)	W	L	W	L	W	M	W	L		
<i>Coprosma repens</i> (looking glass bush, taupata, New Zealand laurel)	L		L		NP		NP			
<i>Coreopsis lanceolata</i> (coreopsis, tickseed)	W	L	W	L	E		?			
<i>Cortaderia selloana</i> (pampas grass)	W	H	E		L		L			
<i>Cotoneaster</i> spp. (cotoneaster)	W	M	W	M	W	L	L		W	H
<i>Crataegus monogyna</i> (hawthorn)	L		W	M	L		W	H	W	H
<i>Cyperus eragrostis</i> (umbrella sedge)	W	H	W	L	W	L	W	H		
<i>Cytisus scoparius</i> (Scotch broom, English broom)	W	M	W	H	L		L			
<i>Dactylis glomerata</i> (cocksfoot)	L		W	M	L		W	L		
<i>Delairea odorata</i> (Cape ivy)	W	H	W	H	W	L	NP			
<i>Echinochloa crus-galli</i> (barnyard grass)	L		W	L	W	L	L			
<i>Ehrharta calycina</i> (perennial veldtgrass)	W	M	L		L		L			
<i>Ehrharta erecta</i> (panic veldtgrass)	W	M	W	M	W	M	?			
<i>Eragrostis curvula</i> (African lovegrass)	W	H	W	H	W	H	W	H		
<i>Gamochaeta americana</i> (wooly cudweed, America everlasting)	L		W	L	W	L	W	L		
<i>Gamochaeta calviceps</i> (grey cudweed)	L		W	L	W	L	W	L		
<i>Gamochaeta pennsylvanica</i> (woolly cudweed, wandering cudweed)	L		L		?		?			
<i>Genista monspessulana</i> (Montpellier broom, French broom)	W	H	W	H	L		L			
<i>Gleditsia triacanthos</i> (honey locust)	W	H	W	H	W	H	NP			
<i>Hedera helix</i> (English ivy)	L		W	H	L		L			
<i>Hedychium gardnerianum</i> (kahili ginger, ginger lily)	L		W	M	NP		NP			
<i>Holcus lanatus</i> (Yorkshire fog)	L		W	H	L		W	L		
<i>Hydrocotyle bonariensis</i> (large-leaf pennywort)	L		L		L		NP			
<i>Hygrophila costata</i> (hygrophila/glush weed)	E		NP		NP		?			
<i>Hyparrhenia hirta</i> (Coolatai grass)	E		E		E		A		W	H
<i>Hypericum perforatum</i> (St John's wort)	W	L	W	M	W	M	W	H		
<i>Hypochaeris radicata</i> (catsear, flatweed)	W	M	W	L	W	L	W	L		
<i>Ilex aquifolium</i> (English holly, common holly)	L		W	H	L		NP			

Primary weeds considered at workshops	Windsor		Katoomba		Picton		Goulburn		Lithgow	
Scientific name (Common name)	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²
<i>Impatiens walleriana</i> (impatiens)	L		L		L		NP			
<i>Ipomoea cairica</i> (coastal morning glory, mile-a-minute)	L		E		NP		NP			
<i>Ipomoea indica</i> (blue morning glory)	W	H	W	H	W	H	NP			
<i>Ipomoea purpurea</i> (common morning glory)	W	H	W	H	W	H	NP			
<i>Juncus acutus</i> (spiny rush, spike rush, sharp rush)	W	H	L		W	H	W	H		
<i>Juncus articulatus</i> (joint rush)	W	H	W	H	?		?			
<i>Lantana camara</i> (lantana)	W	H	W	H	W	H	NP			
<i>Ligustrum lucidum</i> (large-leaf privet)	W	H	W	M	W	H	W	H		
<i>Ligustrum sinense</i> (small-leaf privet, Chinese privet)	W	H	W	H	W	H	L			
<i>Lilium formosanum</i> (formosa lily, tiger lily)	L		W	L	L		?			
<i>Lolium perenne</i> (perennial ryegrass)	L		W	L	W	M	W	L		
<i>Lonicera japonica</i> (Japanese honeysuckle)	W	H	W	H	W	H	NP			
<i>Lotus uliginosus</i> (birds-foot trefoil)	E		W	L	?		L			
<i>Ludwigia peruviana</i> (ludwigia/ Peruvian water primrose)	W	H	L		W	H	NP			
<i>Lycium ferocissimum</i> (African boxthorn)	W	H	L		W	M	W	H		
<i>Macfadyena unguis-cati</i> (cat's claw creeper)	W	H	E		L		NP			
<i>Marrubium vulgare</i> (white horehound)	L		L		L		W	M		
<i>Nassella trichotoma</i> (serrated tussock, Yass tussock)	E		W	H	W	H	W	H		
<i>Ochna serrulata</i> (Mickey Mouse plant)	W	H	W	L	L		NP			
<i>Olea europaea</i> subsp. <i>cuspidata</i> (African olive)	W	H	E		W	H	E			
<i>Opuntia</i> spp. (prickly pear, drooping pear, smooth tree pear)	W	M	W	H	W	L	NP			
<i>Panicum repens</i> (torpedo grass)	E		NP		?		?			
<i>Parapholis incurva</i> (coast barb grass, curved sickle-grass)	?		NP		NP		NP			
<i>Paspalum dilatatum</i> (paspalum)	W	H	W	M	W	M	W	L	W	H
<i>Paspalum quadrifarium</i> (tussock paspalum)	W	H	L		?		L			
<i>Paspalum urvillei</i> (Vasey grass, paspalum)	W	?L	W	M	NP		?			
<i>Passiflora subpeltata</i> (white passionflower)	L		E		L		NP			
<i>Pennisetum clandestinum</i> (kikuyu)	W	M	W	H	W	M	W	L		
<i>Pennisetum villosum</i> (feathertop, white foxtail)	L		E		E		W	L		
<i>Phalaris aquatica</i> (bulbous canary grass, phalaris)	L		L		NP		W	H		
<i>Physalis peruviana</i> (Cape gooseberry)	L		L		?		NP			
<i>Plantago</i> spp. (lamb's tongues)	W	L	W	L	W	L	W	M		

Primary weeds considered at workshops	Windsor		Katoomba		Picton		Goulburn		Lithgow	
	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²
<i>Polypogon monspeliensis</i> (annual beardgrass, rabbitsfoot grass)	?		NP		?		?			
<i>Potentilla indica</i> (Indian strawberry)	?		NP		NP		?			
<i>Pyracantha</i> spp. (orange firethorn)	L		W	M	NP		L		W	H
<i>Ranunculus repens</i> (creeping buttercup)	W	H	W	H	L		L			
<i>Rosa rubiginosa</i> (sweet briar, briar rose, eglantine)	L		W	L	L		W	M		
<i>Rubus fruticosus</i> agg. (blackberry)	W	H	W	H	W	H	W	H		
<i>Salix</i> spp. (willow)	W	H	W	H	W	H	W	H		
<i>Salvinia molesta</i> (salvinia)	W	H	L		W	H	NP			
<i>Senecio madagascariensis</i> (fireweed)	W	L	W	L	W	M	W	H		
<i>Senna pendula</i> (cassia/winter senna)	W	M	W	L	L		W	L		
<i>Senna septemtrionalis</i> (arsenic bush)	?		NP		?		?			
<i>Sida rhombifolia</i> (Paddy's lucerne)	W	L	W	L	W	M	?			
<i>Solanum mauritianum</i> (wild tobacco plant)	W	M	W	M	W	L	NP			
<i>Solanum nigrum</i> (blackberry nightshade)	W	M	W	L	W	L	W	M		
<i>Solanum pseudocapsicum</i> (Madeira winter cherry, Jerusalem cherry)	W	M	W	L	L		NP			
<i>Solanum seaforthianum</i> (climbing nightshade)	L		E		?		NP			
<i>Sonchus oleraceus</i> (common sowthistle)	W	L	W	L	W	L	W	L		
<i>Sporobolus fertilis</i> (giant Parramatta grass)	L		L		W	M	A			
<i>Stenotaphrum secundatum</i> (buffalo grass, soft buffalo)	W	L	W	L	W	L	NP			
<i>Taraxacum officinale</i> (dandelion, pissabed)	W	L	W	L	W	L	W	L		
<i>Thunbergia alata</i> (black-eyed susan vine)	W	M	L		L		NP			
<i>Tradescantia fluminensis</i> (trad)	W	H	W	H	W	H	L			
<i>Verbena bonariensis</i> (purpletop)	W	L	W	L	W	H	L			
<i>Vicia sativa</i> (spring vetch)	L		W	L	L		NP			
<i>Vinca major</i> (blue periwinkle, greater periwinkle)	W	H	W	H	L		L			
<i>Vulpia myuros</i> (rat-tailed fescue)	L		W	L	NP		W	L		
<i>Xanthium occidentale</i> (Noogoora burr, cockle burr)	W	L	W	L	W	M	L			

(D¹) Distribution definitions: W = widespread; L = localised; E = emerging; A = alert; NP = not present; ? = not sure or unknown; blank cells = distribution not considered or not widespread

(I²) Impact definitions: VH = very high; H = high; M = medium; L = low; blank cells = impact not considered

Table C21. Secondary list of weeds considered at workshops in HNCMA region.

Secondary list considered at all workshops	Windsor		Katoomba		Picton		Goulburn		Lithgow	
Scientific name (Common name)	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²
<i>Arundo donax</i> (Spanish reed, giant reed, elephant grass)	W	VH	W	H	W	H				
<i>Berberis aristata</i> (Nepal barberry)			W	H						
<i>Brassica rapa</i> (field mustard, turnip)							W	L		
<i>Buddleja davidii</i> (buddleja, butterfly bush)			W	H	E					
<i>Buddleja madagascariensis</i>										
<i>Carduus nutans</i> (nodding thistle)			W	L	W	L	W	L		
<i>Carthamus lanatus</i> (saffron thistle)			W	L	W	L	W	L		
<i>Cestrum parqui</i> (green cestrum, green poisonberry)	W	H	W	H	W	H				
<i>Conium maculatum</i> (hemlock)			W	M			W	L		
<i>Cortaderia jubata</i> (pink pampas grass)	W	H								
<i>Crococsmia x crocosmiiflora</i> (montbretia)	W	H	W	H						
<i>Cuscuta campestris</i> (golden dodder)										
<i>Cyperus esculentus</i> (yellow nutgrass)					W	L				
<i>Datura ferox</i> (fierce thornapple, longspine thornapple)										
<i>Datura stramonium</i> (common thornapple)	W	L	W	L			W	L		
<i>Deutzia crenata</i>			E						W	H
<i>Dipogon lignosus</i> (dolichos pea)										
<i>Echium plantagineum</i> (Paterson's curse)	W	L	W	H	W	L	W	H		
<i>Eichhornia crassipes</i> (water hyacinth)	W	H			W	H	A			
<i>Erica lusitanica</i> (Spanish heath)			W	H						
<i>Erigeron karvinskianus</i> (bony-tip fleabane, seaside daisy)	W	M	W	H						
<i>Erythrina sykesii</i> (coral tree)	W	H			E					
<i>Eschscholzia californica</i> (California poppy)			W	L						
<i>Foeniculum vulgare</i> (fennel)	W	L	W	M	W	L	W	L		
<i>Fraxinus angustifolia</i> (desert ash)										
<i>Freesia hybrid</i> (freesia)										
<i>Genista linifolia</i> (flaxleaf broom)			E							
<i>Hypericum</i> spp.			W	H						
<i>Lavandula stoechas</i> (Italian lavender, Spanish lavender)										
<i>Leucanthemum vulgare</i> (ox-eye daisy)			W	H						
<i>Leycesteria formosa</i> (Himalaya honeysuckle)			W	H						
<i>Mentha piperita</i> (peppermint)										
<i>Myosotis sylvatica</i> (forget me not)			E							

Secondary list considered at all workshops	Windsor		Katoomba		Picton		Goulburn		Lithgow	
Scientific name (Common name)	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²
<i>Nassella neesiana</i> (Chilean needle grass)	W	H	E		W	H	W	H		
<i>Onopordum acanthium</i> (Scotch thistle)	W	L	W	L	L		W	L		
<i>Onopordum illyricum</i> (Illyrian thistle)							W	L		
<i>Oxalis pes-caprae</i> (soursob)	W	L	W	L						
<i>Passiflora edulis</i> (common passionfruit, black passionfruit)			W	L	E					
<i>Passiflora filamentosa</i>					E					
<i>Passiflora tarminiana</i> (banana passionfruit)			W	M	E					
<i>Phyllostachys aurea</i> (rhizomatous bamboo, fishpole bamboo)	W	H	W	H	W	H				
<i>Phyllostachys nigra</i> (black bamboo)										
<i>Phytolacca octandra</i> (inkweed)	W	M	W	L	W	L	L		W	H
<i>Pinus radiata</i> (radiata pine, monterey pine)			W	H	W	M	E			
<i>Populus alba</i> (white poplar)	W	L	W	H			W	H		
<i>Populus nigra</i> (lombardy poplar)	W	L								
<i>Prunus cerasifera</i> (cherry plum)										
<i>Prunus laurocerasus</i> (cherry laurel)			W	H						
<i>Ricinus communis</i> (castor oil)	W	H	W	H	W	M	E			
<i>Robinia pseudoacacia</i> (black locust)	W	H			E					
<i>Schinus molle</i> (pepper tree, Peruvian mastic tree)					W	L				
<i>Silybum marianum</i> (variegated thistle)					W	L	W	L		
<i>Sporobolus africanus</i> (Parramatta grass)	W	M	W	L	W	M				
<i>Toxicodendron succedaneum</i> (rhus tree)	W	L	W	L	L		W	L		
<i>Tribulus terrestris</i> (caltrop, cat-head)					L		E			
<i>Ulex europaeus</i> (gorse, furze)			W	H	W	H	W	H		
<i>Verbascum thapsus</i> (blanket weed, great mullein, Aaron's rod)			W	L			L			
<i>Zantedeschia aethiopica</i> (arum lily, pig lily, calla lily)	W	M	W	M	E					

¹Distribution (D) abbreviations: W = widespread; L = localised; E = emerging; A = alert; NP = not present; ? = not sure or unknown; blank cells = distribution not considered or not widespread.

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

Table C22. Weeds added by workshop participants in the HNCMA region.

Added by workshop participants	Windsor		Katoomba		Picton		Goulburn		Lithgow	
Scientific name (Common name)	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²	D ¹	I ²
<i>Echium vulgare</i> (vipers bugloss)									W	H
<i>Egeria densa</i>					W	H				
<i>Eucalyptus citriodora</i> (lemon scented gum)	W	L								
<i>Festuca arundinacea</i> (tall fescue)			W	M						
<i>Gymnocoronis spilanthoides</i> (Senegal tea plant)	W	H								
<i>Heliotropium amplexicaule</i> (blue heliotrope)									W	H
<i>Jasminum polyanthum</i> (jasmine)	W	H	W	M						
<i>Juncus effusus</i>			W	M						
<i>Juncus microcephalus</i>			W	H						
<i>Miscanthus sinensis</i> (zebra grass)			W	M						
<i>Opuntia aurantiaca</i> (tiger pear)	W	H								
<i>Passiflora caerulea</i> (blue passionflower)			W	L						
<i>Pennisetum setaceum</i> (fountain grass)					E					
<i>Polygala virgatum</i>					E					
<i>Sagittaria platyphylla</i> (sagittaria)					E					
<i>Xanthium spinosum</i> (Bathurst burr)							E			

¹Distribution (D) abbreviations: W = widespread; L = localised; E = emerging; A = alert; NP = not present; ? = not sure or unknown; blank cells = distribution not considered or not widespread.

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

**APPENDIX C4.
PRIORITY WIDESPREAD WEEDS IMPACTING ON BIODIVERSITY IN THE
HNCSA REGION SORTED BY AREA**

<i>Scientific name (Common name)</i>	<i>Scientific name (Common name)</i>
List specific to Katoomba/Lithgow workshop	List specific to Windsor workshop
<i>Acer pseudoplatanus</i> (sycamore maple)	<i>Acacia baileyana</i> (Cootamundra wattle)
<i>Anthoxanthum odoratum</i> (sweet vernal grass)	<i>Acacia saligna</i> (golden wreath wattle)
<i>Berberis aristata</i> (Nepal barberry)	<i>Acetosa sagittata</i> (rambling dock, turkey rhubarb)
<i>Buddleja davidii</i> (buddleja, butterfly bush)	<i>Araujia sericifera</i> (moth vine, mothplant)
<i>Cotoneaster</i> spp.	<i>Asparagus aethiopicus</i> (asparagus fern, sprengeri fern)
<i>Cytisus scoparius</i> (Scotch broom, English broom)	<i>Cortaderia jubata</i> (pink pampas grass)
<i>Deutzia crenata</i>	<i>Cortaderia selloana</i> (pampas grass)
<i>Echium vulgare</i> (vipers bugloss)	<i>Erythrina</i> spp. (coral tree)
<i>Erica lusitanica</i> (Spanish heath)	<i>Gymnocoronis spilanthoides</i> (Senegal tea plant)
<i>Erigeron karvinskianus</i> (bony-tip fleabane, seaside daisy)	<i>Jasminum polyanthum</i> (jasmine)
<i>Hedera helix</i> (English ivy)	<i>Ludwigia longifolia</i> (long-leafed primrose)
<i>Heliotropium amplexicaule</i> (blue heliotrope)	<i>Macfadyena unguis-cati</i> (cat's claw creeper)
<i>Holcus lanatus</i> (Yorkshire fog)	<i>Ochna serrulata</i> (Mickey Mouse plant)
<i>Hyparrhenia hirta</i> (Coolatai grass)	<i>Paspalum quadrifarium</i> (tussock paspalum)
<i>Hypericum</i> spp.	<i>Robinia pseudoacacia</i> (black locust)
<i>Ilex aquifolium</i> (English holly, common holly)	List specific to Picton workshop
<i>Juncus microcephalus</i>	<i>Egeria densa</i> (egeria)
<i>Leucanthemum vulgare</i> (ox-eye daisy)	<i>Verbena bonariensis</i> (purpletop)
<i>Leycesteria formosa</i> (Himalaya honeysuckle)	List specific to Goulburn workshop
<i>Pennisetum clandestinum</i> (kikuyu)	<i>Hypericum perforatum</i> (St John's wort)
<i>Pinus radiata</i> (radiata pine, Monterey pine)	<i>Phalaris aquatica</i> (bulbous canary grass, phalaris)
<i>Prunus laurocerasus</i> (cherry laurel)	<i>Senecio madagascariensis</i> (fireweed)
<i>Pyracantha</i> spp. (orange firethorn)	
<i>Phytolacca octandra</i> (inkweed)	

**APPENDIX C5.
PRIORITY HABITATS AND CORRIDORS FOR THREATENED FAUNA IN
THE HNCMA REGION**

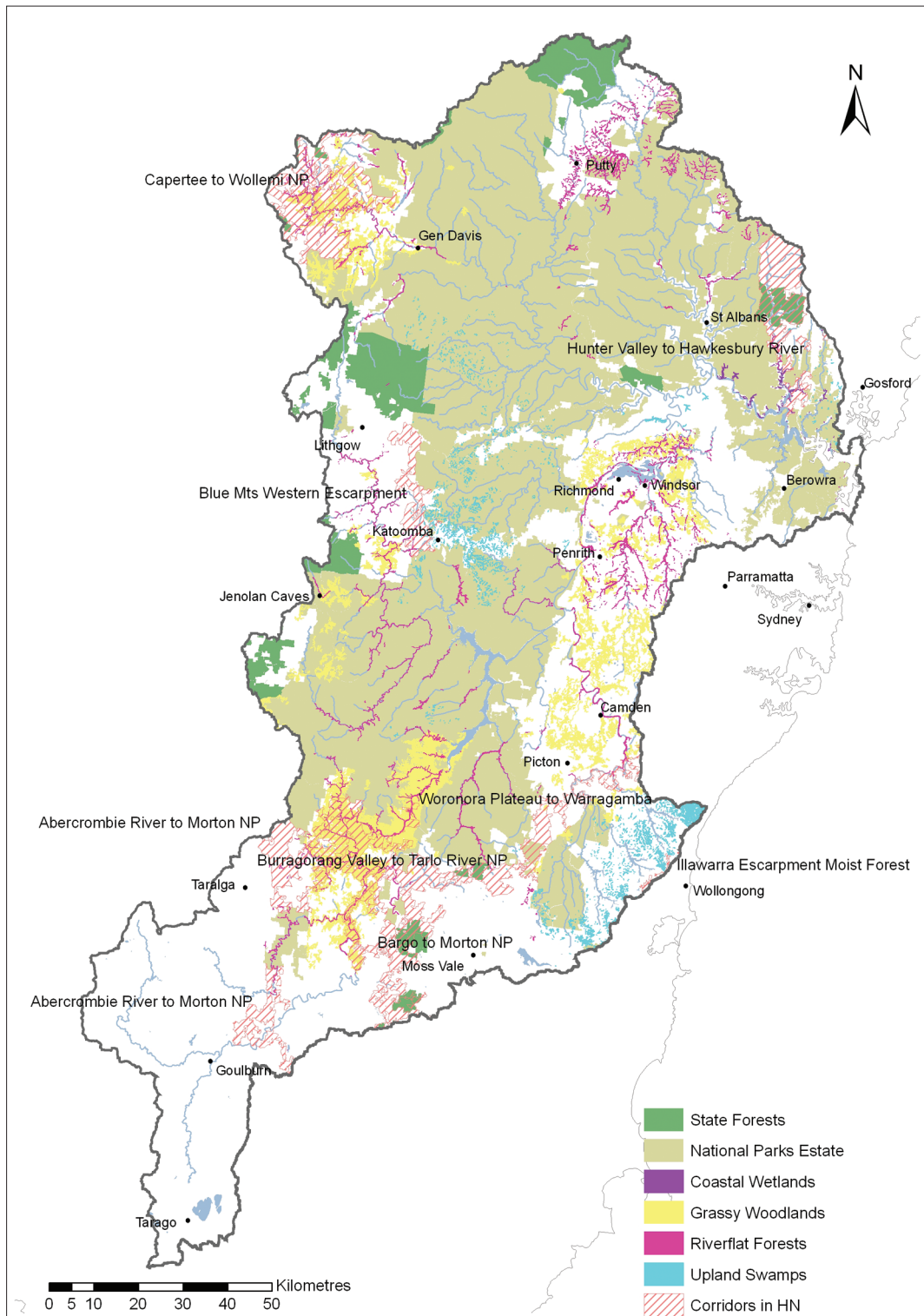


Figure C6 Map showing priority habitats and corridors for threatened fauna in the Hawkesbury-Nepean Catchment (DECC 2007).

Table C23. Vegetation communities that represent priority habitat for threatened fauna in the HNCMA region

Habitat	Code	Mapped Vegetation Community (DECCW combined vegetation map)
Grassy Woodlands	GW	Blue Mountains Shale Cap Forest
		Coastal Grassy Red Gum Forest
		Cooks River Castlereagh Ironbark Forest
		Cumberland Plain Alluvial Woodland
		Cumberland Plain Shale Hills Woodland
		Cumberland Plain Shale Plains Woodland
		Cumberland Plain Shale Sandstone Transition Forest (Low Sandstone Influence)
		Devonian Red Gum-Grey Box Woodland
		Devonian Red Gum-Ironbark Woodland
		Devonian Red Gum-Yellow Box Woodland
		Douglas Scarp Woodland
		Lowland Melaleuca-Woollybutt forest
		Moist Shale Woodland
		Permian Foothills Grassy Red Gum-Box Forest
		Regenerating Vegetation
		Shale/Gravel Transition Forest
		Tablelands Snow Gum Woodland
		Transitional Shale Dry Ironbark Forest
Turpentine-Ironbark Forest		
Upland Swamps	US	Highlands Sandstone Swamp Woodland
		Upland Swamps: Banksia Thicket
		Upland Swamps: Cyperoid Heath
		Upland Swamps: Fringing Eucalypt Woodland
		Upland Swamps: Mallee-Heath
		Upland Swamps: Restioid Heath Complex
		Upland Swamps: Sedgeland-Heath Complex
		Upland Swamps: Tea Tree Thicket
Alluvial Forests and Woodlands	AF	Burraborang River Flat Forest
		Highlands Alluvial Red Gum Woodland
		Megalong Granite Riparian Forest
		Oakdale Alluvial Rough-barked Apple Forest
		Riparian Forest
		Riparian River Oak Forest
		Tablelands Black Sally Woodland
		Tablelands River Oak Forest
Coastal Wetlands	CW	Alluvial Swamp Mahogany Forest
		Coastal Sand Freshwater Wetland
		Coastal Sand Swamp Mahogany Forest
		Estuarine Lagoons and Channels
		Freshwater Wetland

Table C24. Descriptions of priority corridors for threatened fauna in the HNCMA region

Corridor	Code	Description
Hunter Valley to Hawkesbury River	H-H	Latitudinal corridor that links the southern and easterly sections of the Hunter Valley to the Hawkesbury River
Capertee to Wollemi NP	C-W	Altitudinal gradient linking the southwest slopes of the Capertee Valley and the escarpment sandstone and gorge country of Wollemi NP
Blue Mountains Western Escarpment	BME	Continues the latitudinal link along the western escarpment edge
Illawarra Escarpment Moist Forest	IE	Links a narrow band of moist escarpment forests, which run along a latitudinal expanse from Royal NP to Macquarie Pass NP. This corridor contains an altitudinal gradient that connects the coastal lowlands to the upper sandstone of the Woronora plateau
Woronora Plateau to Warragamba	W-W	Connects the sandstone plateaus of Woronora and the Southern Blue Mountains and maintains links between vegetation communities that are of importance to threatened species from Liverpool to Bargo
Bargo to Morton NP	B-M	An altitudinal expanse that connects the Nattai Sandstone landscape and Bargo area with the sandstone country of Morton NP
Burratorang Valley to Tarlo River NP	B-T	Connects the Grassy Woodlands of the Burratorang Valley with the woodland communities of the southern Highlands and Wollondilly River. It also connects the Nattai gorge landscape with Tarlo River NP
Abercrombie River to Morton NP	A-M	Connects the highland communities of the Blue Mountains with those in Morton NP. Contains an east west altitudinal and rainfall gradient that connects dry country to moist and rises from the south-western slopes to the Mountain Highlands

NP - National Park

**APPENDIX C6.
TEMPLATE OF LETTER SENT TO PRIVATE LANDHOLDERS WITH
VOLUNTARY CONSERVATION AGREEMENTS OR WILDLIFE REFUGES
ON THEIR PROPERTIES**

Date

Address

Dear,

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 within the Hawkesbury Nepean catchment was established (see overleaf).

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 may become 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 Wednesday 30th April. 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 follow the instructions attached to the form and 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**.

Please complete the form to the best of your knowledge. If you are unsure of how to address any of the fields then indicate 'Further Information Required'.

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

**APPENDIX C7.
WEED PROGRAM SURVEY**

The aim of this survey is to put together an inventory of control sites to assess the current status of weed management for biodiversity conservation in the Hawkesbury Nepean Catchment (HNCMA). The results of this survey will form part of a project that will identify priority sites for control for the HNCMA and the information gained will be used to streamline workshops that are to be held in February this year. We need you to complete this survey and save it with your name as the file name and return it to the address below by Monday 14th April 2008.

Please complete both Section 1 and Section 2 (separate worksheets)

Return to: leonie.whiffen@environment.nsw.gov.au

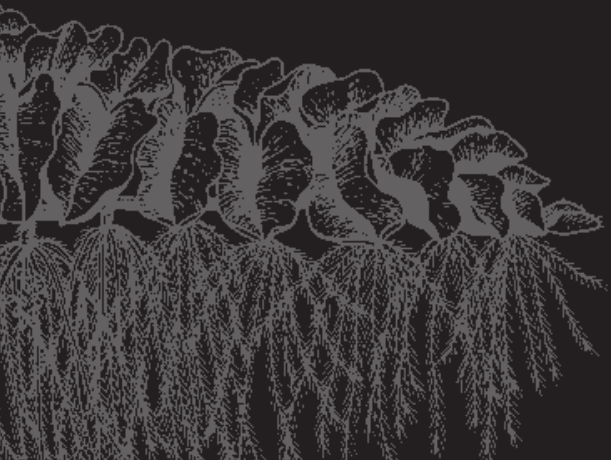
Name: _____ Organisation: _____ Position: _____
 Phone: _____ Email: _____

Section 1: Current weed programs

Site/Program name						
Location (GPS coordinates if possible - latitude/longitude, AMG or MGA)						
What is/are the target weed(s)? Please enter scientific names.						
What is the primary aim of your control program at this site? <i>Select answer from drop down list.</i>						
What is the secondary aim of your control program at this site? <i>Select answer from drop down list.</i>						
If you stated your aim was for biodiversity conservation please name the biodiversity you are trying to save. <i>Select applicable responses from drop down lists.</i>						
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">EEC's</td> <td style="width: 50%; text-align: center;">Threatened Flora</td> </tr> <tr> <td style="text-align: center;">Threatened Fauna</td> <td style="text-align: center;">Other (please specify)</td> </tr> </table>	EEC's	Threatened Flora	Threatened Fauna	Other (please specify)		
EEC's	Threatened Flora					
Threatened Fauna	Other (please specify)					
How is the program funded? <i>Select answer from drop down list.</i>						
What was the budget for 06/07? <i>Select range from drop down list.</i>						
What year did the control program begin? <i>Select from drop down list.</i>						
What control/restoration methods are used at this site? <i>Enter 'y' for each applicable response.</i>						
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">herbicide</td> <td style="width: 50%;">hand weeding</td> </tr> <tr> <td>mechanical</td> <td>biological control</td> </tr> <tr> <td colspan="2">other (please specify)</td> </tr> </table>	herbicide	hand weeding	mechanical	biological control	other (please specify)	
herbicide	hand weeding					
mechanical	biological control					
other (please specify)						

Section 2: Monitoring (please answer the following questions for each of your current weed programs)

Site		
Do you conduct monitoring at this site? (y/n) <i>If no, you don't need to answer any more questions for this site.</i>		
What aspects of your control plan do you monitor? <i>Enter 'y' for each applicable response.</i>		
response of weed(s) to control response of native plants to control of weed(s) the effectiveness of the control technique changes to other weed species following control financial and labour costs other (please specify)		
What monitoring techniques do you use? <i>Enter 'y' for each applicable response.</i>		
photo points	mapping (specify type)	transects
quadrats/plots	species counts	density/cover percentages
visual	other (please specify)	
Do you use standardised data sheets? (y/n)		
How do you store your data? <i>Select answer from drop down list.</i>		
How do you analyse your data? <i>Select answer from drop down list.</i>		
Who do you communicate your results to? <i>Enter 'y' for each applicable response.</i>		
other staff members	managers	funding bodies
public/community	other (please specify)	
What year did you start monitoring at this site? <i>Select year from drop down list.</i>		



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