



# REGIONAL WEED MANAGEMENT PLAN

**1.1 PLAN TITLE: Sydney-wide Grasses Management Plan (“The Big Four”)**

## 1.2 PLAN PROPONENTS

Regional Weeds Advisory Committee: **Sydney North Regional Weeds Committee; Sydney Central Regional Weeds Committee; South West Sydney Regional Weeds Committee; Sydney West ~ Blue Mountains Regional Weeds Committee**

Address: **City of Ryde Council, Locked Bag 2069 North Ryde NSW 1670**

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Signature: Approved by Adam Smith, City of Ryde ..... Date: 3.5.06.....

## 1.3 NAME OF PLANT(S)

**WONS 2**

(WONS = Chilean Needle Grass and Serrated Tussock)

Botanical name(s): *Paspalum quadrifarium* Common name(s): ..... Tussock Paspalum

Botanical name(s): *Nassella neesiana* ..... Chilean Needle Grass

Botanical name(s): *Nassella trichotoma* ..... Serrated Tussock

Botanical name(s): *Hyparrhenia sp.* ..... Coolatai Grass

## 1.4 PLAN PERIOD (not to exceed five years)

Starting date: **July 2006**

Completion date: **June 2011**

## 1.5 AREA OF OPERATION:

This plan extends over the geographical area represented by the four Regional Weeds Committees in the Sydney region.

## 1.6 AIM

To protect natural areas in the Sydney region by reducing infestations and preventing the spread of “The Big Four” grasses: Tussock Paspalum, Chilean Needle Grass, Serrated Tussock and Coolatai Grass on public and private land.

## 1.7 OBJECTIVES

1. To identify, inspect and record infestations and at risk sites of the Big Four grasses (ie sites that are at risk of having new incursions)
2. To strategically reduce known infestations and prevent the spread of the Big Four grasses
3. To increase the awareness, identification and control skills among Council/state agency staff and contractors
4. To increase the awareness, identification and control skills among Bushcare/ Landcare volunteers, and private landholders.

## 2.0 STAKEHOLDERS

### 2.1 SIGNATORIES

All Councils, state and federal government agencies represented on the four Regional Weeds Committees in the Sydney region.

### 2.2 STAKEHOLDERS

\*\* Stakeholders who are critical to the success of this Plan as at November 2005.

<b>Sydney West~Blue Mountains Regional Weeds Committee **</b> Parramatta, Blue Mountains, Hawkesbury River County Council (includes Penrith, Blacktown, Hawkesbury, Baulkham Hills LGA's), Auburn and Holroyd Councils	<b>South West Sydney Regional Weeds Committee **</b> Camden, Bankstown, Campbelltown, Sutherland, Wollondilly, Fairfield, Liverpool and Campbelltown Councils.
<b>Sydney North Regional Weeds Committee**</b> Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Manly, Mosman, North Sydney, Pittwater, Ryde, Warringah and Willoughby Councils.	<b>Sydney Central Regional Weeds Committee</b> Randwick and Strathfield Councils** (Ashfield, Burwood, Canada Bay, Leichhardt, Marrickville, Hurstville, Kogarah, Rockdale, Sydney City, Woollahra, Waverley, Botany and Canterbury Councils have no known infestations at this stage)
Department of Environment and Conservation (DEC) – National Parks & Wildlife **	Department of Primary Industries **
Department of Infrastructure, Planning and Natural Resources (DIPNR)	Hawkesbury Nepean Catchment Management Authority
Department of Lands **	Sydney Metropolitan Catchment Management Authority
Sydney Catchment Authority	
Sydney Water **	Department of Defence **
Railcorp**	Rural Lands Protection Board **
Roads and Traffic Authority **	Sydney Harbour Federation Trust **
Department of Housing **	Nursery and Garden Industry NSW & ACT
Bushcare and Landcare groups **	Private landholders – urban and rural **

## 3.0 BACKGROUND and JUSTIFICATION

### 3.1 Plan Justification and Description of the Problem

“The Big Four” grasses are highly invasive and densely growing weed species, which are not yet widely distributed throughout the Sydney region. The purpose of this Plan is to:

- determine where the infestations of these Grasses are,
- ensure that agency staff, volunteers and community members are able to identify and control these species and,
- reduce and strategically eradicate, where possible, the infestations (while they are still manageable).

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the invasion of native plant communities by exotic perennial grasses as a Key Threatening Process in Schedule 3 of the Act. The determination specifically mentions Coolatai Grass, Chilean Needlegrass and Serrated Tussock.

“The Scientific Committee has found that:

1. A number of exotic perennial grasses including...*Hyparrhenia hirta* (Coolatai Grass),...*Nasella neesiana* (Chilean Needlegrass) and *Nasella trichotoma* (Serrated Tussock) invade and may dominate native plant communities competing with, and displacing, many native species....Other exotic perennial grasses not specified may, or have the potential to, adversely affect native plant communities and native species.” This last statement can include Tussock Paspalum.

“3. The characteristic of vigorous growth, prolific seed production and effective seed dispersal enable many exotic perennial grasses to compete strongly with, or in some places displace, native vegetation. Exotic perennial grasses may also change the fuel load in plant communities. The changed structure and fire regimes of the habitat is likely to adversely impact on both native vertebrate and invertebrate fauna.”

Cumberland Plain Woodland has been included in the list of Endangered Ecological Communities identified as being under threat from invasion by exotic perennial grasses.

By implementing this Regional Plan while these grasses are still controllable, their spread can be prevented and present infestations reduced to manageable levels on a regional scale. Once these grasses spread into bushland and natural areas, it becomes very time consuming, labour intensive and expensive to remove them. Each local control authority recognises their responsibility and has made a commitment to effectively manage infestations of the Big Four grasses under the terms of this plan.

### **Tussock Paspalum**

Tussock Paspalum is a highly invasive plant able to establish on edges and spread into bushland. Once established, the weed has the ability to form extremely dense infestations that out compete all other vegetation. Removal of the plant is time-consuming and almost always requires follow-up treatment. At present and from what is known about its infestations, the plant has limited distribution mainly in the Sydney North region.

Early Bushcare volunteer observations indicate that the weed established in Delhi Park mid 1950. Its appearance coincided with circus companies which repeatedly occupied the site. The circus animals consumed the weed and successfully spread the seed through areas of Delhi Park as far as Wicks Road in the north of Delhi Park. During this period the weed was contained within the park mainly because Ryde Council regularly mowed the grounds. However, in 1995 Delhi Park was converted into a work compound by the developers of the M2 Tollway. During this period, heavy machinery appeared to spread weed seed as plants began seriously invading areas outside Delhi Park, for the first time in late 1995. This is confirmed by residents directly adjacent Delhi Park. Further confirmation is the fact that in the brief period since 1995 the weed has spread into adjacent Lane Cove National Park, on both sides of Delhi Road. It has also spread on both sides of Epping Road from the Delhi Rd intersection, where Delhi Park is located. For the above reasons, this weed is containable, however, it requires immediate action.

Considerable achievements have already been gained by councils in the Sydney North region to prevent the spread and reduce the extent of Tussock Paspalum under the former Sydney North Regional Weed Management Plan for Tussock Paspalum, which expired in June 2005. However, much follow up and expansion of this work is required to build upon this success and remain on top of the infestations. In Sydney North there are a limited number of 'hot spots' where the plant is located. These infestations provide the seed source for new infestations to occur nearby. The best way to deal with Tussock Paspalum is to control it as soon as it appears. Targeting small, isolated infestations as soon as possible will save much time and money now and in the future.

Specific achievements to date in the Sydney North region include:

- Tussock Paspalum has now been eradicated from Mosman LCA

- Warringah Council has had success with trial burning of Tussock Paspalum clumps for effective control
- Infestations in City of Ryde , Willoughby, and neighbouring Lane Cove National Park have been reduced.

A continued effort of immediate control, follow up and monitoring of Tussock Paspalum is required over the next 5 years to ensure these results are maintained.

### **Chilean Needle Grass**

Chilean Needle Grass is regarded as one of the worst weeds in Australia due to its invasiveness, potential for spread, and economic and environmental impacts. It is classified as a Weed of National Significance and is fast becoming a serious agricultural and environmental weed in south eastern Australia. Chilean Needle Grass can thrive in a wide range of soils and conditions, tolerates drought and heavy grazing and has the potential to be very invasive over a large part of the country. The potential distribution is estimated to exceed 40 million hectares.

Chilean Needle Grass affects both pasture and native grasslands of south eastern Australia. Heavy infestations can decrease land productivity by as much as 50% during summer. It is less productive and less palatable than other pasture species. In addition the sharp seeds can blind livestock and are a serious wool contaminant. As an environmental weed, it threatens biodiversity in native grasslands and along roads where its dense stands will out-compete indigenous vegetation.

It has a large, long-lived soil seed bank and is a prolific seeder - can produce more than 20,000 seeds per square metre. It also has hidden seeds under the leaf-sheaths on the flowering stems which mature even if the seed head has been removed.

At present, Chilean Needle Grass is well established in parts of NSW, including the Southern Tablelands, and Victoria. In the Sydney region it is still found only in relatively small, sparse and isolated populations. However it has potential to spread much further and threatens the endangered Cumberland Plain Woodland vegetation communities which have an open grassy understorey.

The MSD Site at Ingleburn is believed to have been the first Chilean Needle Grass invasion of the Cumberland Plain due to the extent of the infestation found in 2002. It probably arrived through livestock or grain feed.

### **Serrated Tussock**

Serrated Tussock is also regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread and its economic and environmental impacts. It is not known how it was first introduced into Australia but was recognised as a problem in many areas before World War 2.

Serrated Tussock has no grazing value because of its high fibre and low protein content. Infestations result in a significant loss in livestock production, and dense infestations may completely dominate pasture, making large areas incapable of supporting livestock. In native grasslands, Serrated Tussock threatens biodiversity by outcompeting native species.

Serrated Tussock is widespread in south eastern Australia and increasing its range. It is tolerant to drought, fire and grazing and has few natural enemies. It is adapted to a wide range of climates and soil types and is spreading into metropolitan areas. It started to appear in the Sydney region in the last few years, in the higher altitude council areas of Wollondilly and Campbelltown. It is assumed that it has spread north along the Hume Highway from the Southern Highlands, as most infestations are near this road corridor. As hot summer temperatures limit its distribution, it is not anticipated that it will spread from here to the rest of the Sydney region. However, it has potential to become a much bigger problem in these two LCAs as well as spreading to Camden and affecting valuable rural and peri-urban land. Early intervention of this new weed incursion is a high priority.

## **Coolatai Grass**

Coolatai Grass is a native of South Africa and the Mediterranean region. Since its introduction to northern New South Wales for erosion control in the 1940's it has spread around Australia along roadsides and stock routes and invaded grazing lands on many properties. It grows on a variety of soil types including rocky outcrops, and sandy or salty soil. Extensive infestations exist in the NSW northern tablelands as well as the Hunter Valley where, of particular concern to Sydney, it is proliferating along the F3 Freeway.

Coolatai Grass grows prolifically during the warm months and is extremely drought resistant. It will grow in most places, spreads rapidly and is very invasive - it has even been observed to outcompete African Lovegrass. It particularly likes highly disturbed edges, rail verges and roadways, however it will also grow and germinate in natural areas. It forms large tussocks which crowd out native grasses, ground covers and small herbaceous plants. It can also dominate native pastures as it avoided by livestock because of its low digestibility.

Coolatai Grass has only started to appear in the Sydney region in recent years, and at this stage is mostly found in scattered isolated infestations in the Blue Mountains, Parramatta, Ku-ring-gai, Warringah, Hornsby, Randwick and Sutherland LCAs but has the potential to spread much further. It is most obviously spreading into Sydney along the F3 and F6 freeways, and the Great Western Highway.

### **3.2 The 'do nothing' option**

The purpose of this regional plan is early intervention, to contain the threat of The Big Four grasses, before they become too widely distributed and too expensive to control. Currently, all four grasses are at an early enough stage where they can be effectively managed.

If left uncontrolled and untreated, the known infestations will:

- become larger, difficult and very expensive to control, and
- continue to invade agricultural and natural areas, further deteriorating their integrity and biodiversity.

### **3.3 Distribution of the infestations**

#### **3.3.1 Tussock Paspalum**

Tussock Paspalum is scattered throughout the Sydney North region, where it mostly occurs as distinct infestations ranging in size from a few plants to an acre or more. It occurs in areas that have been disturbed, mostly edges, and spreads into the bushland via gravity or water flowing down gullies or tracks.

#### ***City of Ryde***

The main Tussock Paspalum infestation is in Delhi Park located at the top of Pages Creek catchment, in North Ryde. Directly downstream, the creek enters natural bushland for over half a kilometre, before reaching the Lane Cove River. Over the past years, Council has controlled the weed on the edges of this bushland and is now maintaining this work to prevent reinfestation and spread into good bush. The riparian vegetation contains Coachwood and locally rare ground orchids. The area is recognised in Ryde Councils Plan of Management as a significant bush and wetland communities immediately adjacent to the Lane Cove River and the Lane Cove National Park. The reed wetland comprise 5.85 hectares and is unique along Lane Cove River and provides habitat for the 'Red-crowned Toadlet' (*Pseudophryne australis*). It is therefore critical to stop the Tussock Paspalum now in upper Pages Creek, before it reaches the above pristine areas.

### ***Mosman Council***

Small Tussock Paspalum infestations have now been eradicated. On-going monitoring will locate any new outbreaks.

### ***Lane Cove Council***

Small infestations of Tussock Paspalum along Epping Rd have been removed. Sites are now monitored and controlled annually for re-infestation from adjoining council areas. Council takes a pro-active approach to survey for new outbreaks and eradicate them as quickly as possible.

### ***Hunters Hill Council***

There are currently two main infestations of Tussock Paspalum in Hunters Hill - at Boronia Park Bushland Reserve (size 400m<sup>2</sup>) where it is threatening an Endangered Ecological Community listed under the *Threatened Species Act*, and at Gladesville Reserve (size 300m<sup>2</sup>). These infestations are still at a manageable size to eradicate now. Both reserves are of significant recreational and environmental value.

### ***Ku-ring-gai Council***

Tussock Paspalum currently occurs at

- Blackbutt Creek in Lindfield along a fire trail
- Mona Vale Rd St Ives
- Reserve off Yanko Rd Pymble
- St Ives Showground

### ***Pittwater Council***

Tussock Paspalum is a major problem along Mona Vale Road, and occurs as scattered infestations throughout Ingleside. A small infestation also occurs at North Avalon.

### ***Warringah Council***

Tussock Paspalum is a major problem along Mona Vale Road and around Manly Dam along the Wakehurst Parkway. It also occurs along Pittwater Road, Dee Why.

### ***Manly Council***

Tussock Paspalum is a scattered weed in Manly. It currently has a limited distribution, occurring mainly on the edges of bushland reserves and road edges in the suburbs of Seaforth and Balgowlah Heights. Both of these areas are leafy suburbs near national parks with numerous small parks reserves, unmade roads reserves etc and the potential for Tussock Paspalum to spread into unaffected areas is high.

Council's Parks and Bushland staff and bush regeneration contractors currently remove or control Tussock Paspalum in the reserves where they work, however there are a number of areas with limited infestations of Tussock Paspalum that have not yet been treated. It is expected that with an increase in awareness and mapping more Tussock Paspalum will be located around Manly.

### ***Willoughby City Council***

Council staff and community groups have noted the continued increase and spread of Tussock Paspalum in bushland reserves and private properties throughout the council area. Observations and mapping of weed species indicate it is being spread by bushwalkers. It is commonly found along tracks in bushland reserves and growing along roadside verges. Location of infestation sites include: OH Reid Reserve, West Chatswood Harold Reid Reserve, Middle Cove North Arm Reserve, Middle Cove. Council Bushland staff and contractors have continued to suppress and destroy Tussock Paspalum. Bushcare volunteer groups have been active in helping control this weed species on selected sites. Council's Bush Friendly Backyard Program assists residents to identify weeds and advises the appropriate control techniques to remove them from private property. Council is continuing to target this noxious weed to ensure successful eradication of Tussock Paspalum.

### ***Sydney Harbour National Park***

The main infestations are located on the Fairfax Track and the edges of North Head Scenic Drive on North Head. Of major concern is an area of Eastern Suburbs Banksia Scrub which has been declared as an Endangered Ecological Community under the *Threatened Species Conservation Act 1995*.

### ***Lane Cove, Garigal and Ku-ring-gai Chase National Parks***

Field staff are currently controlling this plant where it is moving in through tracks and down wet areas:

- Lane Cove NP area, at the Delhi Rd/Fairyland area in East Ryde, and along road verges, picnic areas and trails within the Park.
- Garigal NP, Bantry Bay (near Seaforth Oval and an Aboriginal site).
- New infestations identified in the western section of Ku ring gai NP in April 2005
- Along the Wakehurst Parkway, Davidson Picnic Area and the entrance to Bluff Track are currently being treated.
- Along RTA arterial roads where control work needs to extend into NP land adjoining the roads.

### ***Bankstown City Council***

A small outbreak was found in 2005 in the northern part of the council area but has now been eradicated. On-going monitoring will be undertaken to find and remove any new infestations.

### ***Holroyd City Council***

From time to time, isolated plants are found and removed at Greystanes Creek, Toongabbie, Prospect Creek, Smithfield and Munro Creek, Greystanes.

### ***Strathfield Council***

Several plants have been found at Dean Reserve, South Strathfield and eradicated. Site is being monitored for re-infestation.

### ***Waverley Council***

Several plants have been found at Hugh Bamford Reserve, North Bondi and eradicated. Site is being monitored for re-infestation.

## **3.3.2 Chilean Needle Grass**

Chilean Needle Grass is currently only known to occur in a few locations in western Sydney. Some of the following descriptions were taken from an unpublished honours thesis by Ens, Emilie-Jane (2002) and require further verification.

### ***Wollondilly Shire Council***

Chilean Needle Grass has been found at two locations. The first is along Eagles Road Razorback and is roughly 40 acres in size. The second was found along the road verge at Montpelier Drive the Oaks.

### ***Campbelltown City Council***

1/ Chilean Needle Grass plants have been previously located on the corner of Watsford Rd and Badgally St, Campbelltown.

2/ A number of Chilean Needle Grass plants have been previously located in Ingleburn.

3/ Chilean Needle Grass infestations have been identified in weedy areas of vegetation adjacent to the railway line at Macquarie Fields.

All these infestation require further inspection and clarification to determine their full extent.

### ***Mount Annan Botanic Garden***

Chilean Needle Grass is particularly concentrated in open grassland (former paddock) areas in the far north western sector of the Garden. Scattered locations (and smaller occurrences) elsewhere, including within remnant Woodland areas, have been, and are being progressively treated and monitored.

### ***Camden Council***

- Camden Valley Way, Leppington. 74m<sup>2</sup> infestation on two properties and adjacent road reserve. Treated in November 2004, and being monitored for follow-up treatment.
- Road reserve of Mount Annan Drive, adjacent Mt Annan Botanical Gardens, extending down pedestrian walkway to Burnett Avenue, and along to Stockman's Drift, near Narellan Road. Approximately 1500m<sup>2</sup> infestation, treated by council in 2005. Site is being monitored for follow-up treatment.

### ***Liverpool City Council***

- Proposed Hoxton Park Nature Reserve. Dense Chilean Needle Grass swards had established in this area. Site owned by DNR and was designated for Western Sydney Orbital. The infestation was primarily in low-lying moist areas along catchment drainage lines but also on higher exposed hilltops along vehicle tracks.
- Leacocks Nature Reserve, Casula. On the eastern side of Leacocks Lane, a patch of approximately 30 Chilean Needle Grass plants were found among a planted native grass community. The first median strip of Leacocks Lane also contained some mature Chilean Needle Grass plants. As of late 2005, no plants were found in this area.
- In late 2005, Chilean Needle Grass was found at Rossmore Grange near the carpark and was removed. The area will be monitored and follow-up control undertaken if required.

### ***Penrith City Council***

Some of this information is from a university thesis and needs to be ground-truthed and confirmed in the first year of this Plan.

- Bill Spilstead Complex for Canine Affairs, Luddenham. This site is a dog training and show facility that had a high infestation of Chilean Needle Grass in mown paddocks and surrounding creek bank and depressions. Grazing paddocks and South Creek border the facility.
- Mamre House, St Clair. (Department of Environment and Conservation – National Parks managed land)
- Caddens Rd, St Mary's. At this site near to Greening Western Sydney plantings and South Creek was evidence of Chilean Needle Grass invasion.
- 7<sup>th</sup> Avenue at Llandilo – large infestation mostly on private land.
- An infestation in a regularly mowed area at Caddens Road, 300 metres from Bringelly Road (Landcom land).

### ***Blacktown***

- An infestation of Chilean Needle Grass was recently found at Dr Charles McKay Reserve Mt Druitt. The area has been sectioned off until control work begins.
- Along the M4 freeway at Wallgrove (RTA managed land)

### ***Holroyd***

Chilean Needle Grass is found at Prospect Creek, Smithfield and Munro Creek, Greystanes. Past isolated populations at Greystanes Creek, Toongabbie and Lower Prospect Canal Reserve, Greystanes (dispersed through feral animal movement – foxes and hares). Potential to spread up and down stream at Prospect and Munro Creek to other reserve areas.

### ***Hawkesbury City Council***

Two sightings of Chilean Needle Grass: one at Yarramundi Lagoon, Agnes Banks and one at Navua Reserve, Grose Wold.

### ***Sydney Water Corporation***

Gate 18, Prospect Reservoir. On and around this fence is a patch of Chilean Needle Grass. This gate is not open to the public and encloses one of the finest examples of Cumberland Plain Woodland.

### ***City of Ryde Council***

This is the most easterly known infestation of Chilean Needle Grass at 33° 47.6' S 151° 04.1' E. Approximately 50 plants occurred at this location on the edge of an oval that is used for dog shows. Linear in shape and bordered by a vegetated, steep slope that was being bush regenerated. The creek at the bottom of the slope was upstream of a series of nature reserve.

### ***Centennial Parklands***

Chilean Needle Grass was identified, reported and removed by Emilie Ens during the time of her Chilean Needle Grass research project. At that time the infestation was localised to an area of approximately twenty square meters adjacent to Busby pond and Parkes Drive opposite Lily pond. However at the time of removal seed production had occurred thus the potential for seed to remain or to be dispersed at the site existed. Since this time a rehabilitation project has been completed involving the infested area. This area is now a mown surface, as such it is believed that Chilean Needle Grass is no longer present within the Parklands

## **3.3.3 Serrated Tussock**

### ***Campbelltown City Council***

Council identified infestations of Serrated Tussock are limited to Menangle Park on agistment land adjacent to the M5 Freeway and Menangle Park Paceway. The infestations range from scattered to light densities. As at October 2005, 620 individual plants have been identified on the agisted land.

Council is currently implementing a project funded by the Hawkesbury Nepean CMA through NHT funding, which includes mapping, education, treatment and site rehabilitation of Serrated Tussock in Menangle Park.

### ***Wollondilly Shire Council***

Serrated Tussock has been identified at 6 properties along Wilton Park Road, 4 properties along Pheasants Nest and Bargo and 3 properties along Razorback range. Seems to occur along the Hume Highway corridor and just west of it. Some manual mapping has been undertaken although a full study is required.

### ***Camden Council***

Four Serrated Tussock plants were identified on private property on Macquarie Grove Road in 2001 by Rural Lands Protection Board staff. They were removed by the occupier, with no recurrence observed.

### ***Mount Annan Botanic Garden***

One infestation of Serrated Tussock was found in 2005 but has been removed.

### ***Sydney Catchment Authority***

Serrated Tussock is found in the Metropolitan Special Area along fire trails between Cordeaux and Avon Dams and the numerous fire trails that traverse the catchments. More commonly it is in higher densities on disturbed open areas such as past mining or agricultural lands. The general control of tussock is now to a low maintenance level. The majority of the time is spent surveying the area to ensure containment of existing areas. One day revegetation programs may be implemented as part of the control program, where it is treated for approximately 4 weeks annually. There is no Serrated Tussock in the Blue Mountains catchments. In the Warragamba catchment (Special Areas) around the Wollondilly River area, it is found mainly on the old agricultural lands and areas of very low fertility and steep gradient.

### ***Blue Mountains City Council***

There is a concentrated infestation of Serrated Tussock throughout 6 private properties, around Chaplowe Creek, a tributary of Coxs River. There are some other small infestations in nearby properties which are currently under control.

### **3.3.4 Coolatai Grass**

#### ***Blue Mountains City Council***

One infestation of Coolatai Grass along the Great Western Highway, between Medlow Bath and Blackheath. A second known infestation along the Great Western Highway at Hazelbrook.

#### ***Parramatta City Council***

The main infestation of Coolatai Grass that is known of is at Old Toongabbie, within the Centenary Park development and associated bushland (land acquired by Council in 2003/2004). There may also be another infestation at Northmead, still needing confirmation.

#### ***Warringah Shire Council***

Very small amounts of Coolatai Grass occur in Warringah. They are under control and not posing a problem.

#### ***Hornsby Shire Council***

Concentrated infestations along the Pacific Highway from Brooklyn to Hornsby.  
Concentrated infestations in the middle of the F3 freeway from Brooklyn to Wahroonga.  
Hornsby Council has done minimal work in some areas. The extent of the infestations is beyond Hornsby Council's available resources for control.

#### ***Ku-ring-gai Council***

Coolatai Grass currently occurs along Mona Vale Rd, St Ives and at St Ives Showground.

#### ***Randwick City Council***

Small isolated Coolatai Grass infestation is located in medium strip along Anzac Pde, Malabar. Also, a larger population at Heffron Park, Maroubra near Fitzgerald Ave (which is mown regularly) and on the nature strip at Grose St, Little Bay.

#### ***Centennial Parklands***

Coolatai Grass was identified at four locations within the Parklands in June 2005 and removed in July. The principal infestation was in a horticultural garden bordering the Depot / Administration Office within Centennial Park. Through consultation with the Horticultural staff it is believed that these grasses were originally bought and planted, unfortunately the date and supplier is unknown. In this principal area dense stands of mature grasses were interspersed through an area of approximately 100m<sup>2</sup>. The three other sites were minor infestations of one to three plants. Monitoring is being conducted.

#### ***Sutherland Shire Council***

Coolatai Grass is found at the following locations:

- Two small patches at Kurnell
- One small patch on Mainabar Road
- Several small patches along the Princes Highway.
- Medium sized patches along Heathcote Road between Old Illawarra Road and Liverpool.
- A heavy infestation on the F6 south of Waterfall.

All these areas are Council's responsibility for management except for the F6 site which is RTA.

## **3.4 Weed Biology/Ecology**

### **Tussock Paspalum**

Tussock Paspalum is a grass which grows in clumps up to one square metre in size, with its seed head extending another metre above the leaves. It appears to flower and produce seed at least twice a year. Each mature plant can produce a myriad of seeds and these seem to primarily drop at the base of the plant, forming new plants in close proximity to the parent. This, in combination with the plant's short, thick rhizomes that spread horizontally, results in very large individual plants and extremely dense infestations of the plant.

Tussock Paspalum can grow to a large size forming almost impenetrable walls and 'march' outwards from its original location. In these situations, Tussock Paspalum dominates other vegetation including scrambling weeds such as Honeysuckle and Blackberry. The displacement of native vegetation has obvious implications for biodiversity of both flora and fauna.

Ideal conditions for germination of the seed are disturbed soil open to direct sunlight, a downhill run for transmission by water, or roadside, where vehicles quickly spread seed. In these situations, the plant can spread rapidly from disturbed edges into native bushland. Alive or dead, mature clumps are highly combustible - a particular hazard on roadsides. While many invasive weeds have a preference for moist, richer sites, Tussock Paspalum has the ability to grow on soils ranging from those that are very sandy through to compacted clay.

Very few native animals appear to use Tussock Paspalum as habitat, but it has been noted as providing excellent shelter for feral cats and rabbits. Nevertheless, in situations where Tussock Paspalum covers a large area, its control should be staged to ensure that any native fauna such as reptiles that may be using it are not too severely disadvantaged.

The plant has a blue/green appearance, is often found alongside streams, wetlands and drains and generally prefers neglected land of low fertility. Its ability to spread is recorded in Spain, where 1 million hectares of depressed Pampas, in low fields and mountain range cattle ground is covered with Tussock Paspalum (Source: [www.monsanto.com.ar/camposdm/paja/mcdm\\_paja.htm](http://www.monsanto.com.ar/camposdm/paja/mcdm_paja.htm)). Tussock Paspalum interferes with availability of light, water, and nutrients preventing normal development of valuable species. The plant is of no economic value being 'high aged material' of low digestibility. Of further concern, many Bushcare volunteers do not recognise this plant, often mistaking it for the less invasive African love grasses and thus not targeting it as a priority.

### **Chilean Needle Grass**

Chilean Needle Grass, a native of South America, is an erect, tufted, perennial, tussock-forming grass which can grow to about 1 m in height. Under grazing, it forms dense clumps by producing many shoots from the base. The leaves are hairless, or sparsely hairy, flat and contain ligules 1 to 5mm wide, flat and strongly ribbed on the upper surface. The leaf margins feel rough because of their short, terminal hairs. The upper leaf surface is bright green whilst the underside is a duller or paler grey-green.

Flowers mainly from September to December but it can potentially flower year round. Distinctive seeds are produced in large, open, drooping, purplish-colour flower heads and the seeds are very sharp at the point. Seeds form about one month after flowering and mainly germinate in autumn and spring. The seed has a long (60 to 80mm) hair joined to the hardened seed head. The seeds are pale brown when mature, mostly 8-10mm long, with an awn 60 – 90 cm long. Another distinctive feature of Chilean Needle Grass is that it also produces seeds at the nodes inside the leaf sheaths. These stem seeds are self fertilised and account for about one quarter of total seed production. They enable the plant to reproduce despite grazing, slashing and fire. Seedlings grow quite slowly but have a very high survival rate and can produce flowers in their first season. The adult plant is long lived and very hardy. Chilean Needle Grass occurs in dry, open habitats with low fertility in temperate regions of Australia with an annual rainfall of more than 500mm. It is thought to have been introduced in the 1930's.

### **Serrated Tussock**

Serrated Tussock is a perennial tussock-forming grass that can live for more than 20 years. It has a deep fibrous root system and grows to a height of 600mm with a maximum diameter at its base of 150mm. The leaves are thin (0.5mm diameter) and tightly rolled, with small easily felt serrations along their length. It is similar to several native grasses in general appearance. The 'ligule' a small flap located at the junction of the leaf blade and the leaf sheath, is the key characteristic of Serrated Tussock. The ligule can be located by tracing a leaf down to where it joins the sheath and bending the leaf back at this point. Serrated Tussock has a white hairless ligule about 1mm long, whereas other grasses have ligules with different colours or hairs, or do not possess them at all.

### **Coolatai Grass**

*Hyparrhenia hirta* is a densely tufted perennial to 1.5m tall with flowering stem up to 90cm, short rhizomes and fibrous roots. It has pale, thin greyish-green leaves 10 - 30 cm long and 1-5mm wide often with a whitish bloom. Tinges of red at the base of more mature stems. The flowering head is a much-branched elongated panicle ending in paired raecemes (flower clusters with flowers on short lateral stalks off the main axis). Spikelets appressed, in pairs 3-7mm long, one sessile and fertile and the other pedicelled. Spikelets are hairy and occur in pairs; one with an awn 15-25mm long. Flowering occurs from January to August.

The paired seed heads are the most recognisable feature of Coolatai Grass and help to differentiate the weed from other species. It was discovered in 2004 that two species of Coolatai Grass were present in Sydney. Both species can resemble Kangaroo grass *Themeda australis sub triandra* and Barbed wire grass *Cymbopogon refractus*. Coolatai plants without seed heads can also look like African Lovegrass.

It is suspected that other species of *Hyparrhenia*, including *H. rufa* may also occur in the Sydney region, however this requires further investigation and confirmation. Hence this plan covers all *Hyparrhenia* species.

## **3.5 Method and Rate of Spread**

### **Tussock Paspalum**

Each plant can grow to a large size through the horizontal movement of its rhizome that sends up suckers, ultimately forming a large, dense tussock. The seeds are sticky at one point in their development and can be spread on clothing, the fur of animals, mud on boots, vehicle tyres and mowing machinery. Primary seed transmitters appear to be runoff, translocation of seed-bearing soil and contaminated machinery. Although it has not been observed, the seeds may also be eaten by birds and spread through droppings. The plant has the ability to spread rapidly, and can form dense infestations within a few years.

### **Chilean Needle Grass**

Seeds are very effectively spread attached to farm and earth moving machinery, clothing or animals (both domestic and native). Seed has also been spread along roadsides and other grassy areas by the use of mowing equipment, a most likely vector in the Sydney region. Water is another significant dispersal agent for the plant. First identified in 1934, it appears to have spread very slowly until the late 1970s and has only recently been recognised as a serious weed. It was first identified in NSW during the early 1940s in the Glen Innes region.

### **Serrated Tussock**

Seeds are mainly spread by wind. Mature plants can produce more than 140,000 seeds per plant per year, and the very light seed head can be blown by wind over long distance (up to 20km). It can also be spread by humans or animals. For example, it can be picked up in mud on the hooves of livestock, can attach to vehicle tyres, farm machinery and slashing equipment, and be transported in moving soil.

### **Coolatai Grass**

Road construction and maintenance, vehicles, people and stock spread this weed by inadvertently picking up seed from mature plants in machinery, tyres, clothing, fur and hair. In some areas Coolatai Grass has been readily spread by mowing and slashing activities of Councils. It is very tolerant of glyphosate when applied without appropriate preparation. As glyphosate is often used for roadside vegetation control, Coolatai Grass can be the only grass remaining after spraying, allowing it to spread into new areas with little or no competition.

## **4.0 LEGISLATIVE and REGULATORY SITUATION**

### **4.1 Current Declaration**

#### **Tussock Paspalum**

Tussock Paspalum is a declared Class 3 noxious weed in Willoughby, Warringah, Lane Cove, North Sydney and Ku-ring-gai LCAs.

#### **Chilean Needle Grass**

Declared as a Class 4 noxious weed in all Sydney region Councils.

#### **Serrated Tussock**

Declared as a Class 4 noxious weed in all Sydney region Councils.

#### **Coolatai Grass**

Not declared noxious anywhere in Sydney or NSW.

### **4.2 Declaration Changes**

#### **Tussock Paspalum**

The remaining Councils in the Sydney North region seek declaration of Tussock Paspalum as a Class 3 noxious weed under the 2006 amendments of the Noxious Weed Act. These Councils are Hornsby, Hunters Hill, Manly, Pittwater, Ryde and Mosman.

At this stage, it is not proposed to seek its declaration in other councils in Sydney. Instead it will be listed as a Weed Alert in these regions.

#### **Coolatai Grass**

It is not proposed to declare Coolatai Grass at this time. Instead, it will be managed as a Weed Alert in the Sydney region.

## **5.0 CONSIDERATIONS and OPPORTUNITIES**

### **5.1 Opportunities to be exploited**

To assist in the implementation of this Plan, specific funding will be continually sought for on-ground control of Tussock Paspalum from the Department of Primary Industries annual noxious weed funding. Funding will also be sought from various state and federal government agencies, such as NHT, CMA and WONS funding, for survey and mapping, on-ground works and developing education and awareness raising programs for Tussock Paspalum, Chilean Needle Grass and Serrated Tussock. Incentives programs will also be investigated and implemented.

On ground control and education will also be funded through existing weed control and bushland management program in Councils and agencies, that are undertaken by staff, contractors and volunteers. Funding for Crown Lands will also be sought.

Each local control authority recognises their responsibility and has made a commitment to effectively

manage infestations of The Big Four grasses under the terms of this plan.

## 5.2 Species Management

### Tussock Paspalum

Because of its size and the scale of some of the infestations, Tussock Paspalum can be difficult to control. The most common method of control is to brush cut the plant and then spray the regrowth with glyphosate. Alternatively, some LCA's have achieved good success by just spraying without the brushcutting. Follow up work is almost always required as the plant can seem to be dead but then resprout a year or more after the initial treatment. Hand removal is possible and is most appropriate for scattered individuals or small infestations, particularly where the soil is sandy or friable.

### Chilean Needle Grass

Once established in an area and allowed to set seed, it is unlikely Chilean Needle Grass can be eradicated. This is because established populations have a persistent seed bank that will enable reinfestation even if adult plants have been killed. Small newly establishing infestations may be eradicated with a great deal of persistence. Therefore it is important to act immediately when an infestation is detected.

Small infestations of only a few plants can be manually removed, bagging all material. For larger infestations, spray with glyphosate and then follow up spot spraying of reinvading seedlings. Pesticide permits are available for Roundup *Biaactive*. Bare ground resulting from herbicide application should be re-seeded to provide the germinating Chilean Needle Grass with competition. Biological agents are being investigated by the CSIRO. No registered herbicides for the control of Chilean Needle Grass are currently available. This poses a barrier to management in some situations, as officers are unable to pass on any chemical recommendations to members of the public. However, 'off-label' permits may be obtained. The most important control technique is prevention. Cleaning of machinery and equipment (eg. mowing) is very important in preventing further spread.

### Serrated Tussock

Light and scattered infestations, like those which exist in Sydney, can be spot sprayed with a registered herbicide, or chipped with a mattock before tussocks set seed. Preventing the invasion of Serrated Tussock is the cheapest and most effective way of controlling it. Landholders should buy certified seed and avoid purchasing hay or stock from contaminated areas. Stock grazed on seeding Serrated Tussock should be placed in a holding paddock for 7-10 days before moving them into a clean paddock. Further information on integrated best management practice is available in the Serrated Tussock Weed Management Guide.

### Coolatai Grass

Spray with glyphosate 20ml/L water in Autumn, or whenever the plant is actively growing and has green leaf, particularly following rain. Do not apply to frost/cold affected plants. A number of applications, preferably 3-4 over the growing period will need to be made for effective control. Hand remove individual plants and seedlings, bagging any seed heads. Do not mow or slash when in seed.

Control of all four grasses will be undertaken in accordance with the *Noxious Weeds Act 1993*, *Protection of the Environment Operations Act (1997)*, and the *Pesticides Act (1999)*.

## 5.3 Extension and Education

The main focus for education and extension activities will be to increase skills in the identification and best practice management of The Big Four grasses by local and state agency staff, volunteers and landholders.

Bush regeneration has wide participation by Bushcare, Dunecare and other community groups throughout the Sydney region, and The Big Four grasses are currently controlled as one of a suite of

weeds addressed at volunteers sites. Community involvement is strongly supported by existing agency bush regeneration programs, including technical support, tools and materials, and complements on-ground work by bush regeneration/weed control staff and contractors in key areas.

This regional plan aims to increase community awareness of The Big Four grasses in the Sydney region through:

- Articles in ratepayer newsletters, Bushcare newsletters and Mayoral columns.
- Raised profile during Weed buster Week
- Working with TAFE Horticultural Schools to educate teachers and students
- Displays and educational material developed for distribution and field days
- Hands on identification and best management practice training at workshops/field days/site visits
- Local media releases and community newsletter articles
- Sydney Weeds Committees website
- Regional brochures– e.g. brochures for individual species, *Stop the Spread* brochures and WEEDeck cards.

## 5.4 Links to other Strategies

The following National and State weed strategies guide the overall direction of this plan.

**1. National Weeds Strategy** The Mission Statement is ".to reduce the detrimental impact of weeds on the sustainability of Australia's productive capacity and natural ecosystems", and Objective 3.2 is to 'encourage the development of strategic plans for weed management at all levels'.

**2. The Weeds of National Significance - Chilean Needle Grass (*Nassella neesiana*) Strategic Plan (2000).** The Vision of this national strategy is "*To stop the spread, and reduce the occurrence and impacts of Chilean needle grass in natural and agricultural ecosystems.*

This plan implements Strategy 2.3.1 Action h of the national strategy which is to: *Develop State, regional and local Chilean needle grass management plans.* The objectives, actions and performance indicators in this plan have been adapted from this national strategy

The national strategy's goals relevant to this regional plan are:

2.1 Identify the Chilean needle grass problem so that the Australian community is aware of the identity, impacts, and threat posed by Chilean needle grass.

2.3 Prevent, contain, and rehabilitate Chilean needle grass infestations so that Australian communities implement best management practices to control Chilean needle grass.

**3. The Weeds of National Significance - Serrated Tussock (*Nassella trichotoma*) Strategic Plan. (2000).** The Vision of this national strategy is "*The impact of serrated tussock is reduced and its spread and establishment across Australia is prevented.*

This plan implements Strategy 2.3.1 Action 1 of the national strategy which is to: *Regional, catchment and local consultation and planning processes ensure integrated programs are developed and resourced.*

The national strategy's goals relevant to this regional plan are:

2.1 Best management practices to reduce serrated tussock are available and adopted.

2.2 The impact of serrated tussock is minimised.

2.3. Communities will embrace their own integrated Serrated Tussock management plans.

## 4 NSW Weeds Strategy

The plan also meets several 'Desired Outcomes' of the **NSW Weeds Strategy**:

- The development and implementation of programs to reduce environmental degradation and the loss of biodiversity through weed invasions. This can be achieved through monitoring river systems and wetlands to identify aquatic weed problems at an early stage so that they can be controlled with minimal environmental damage, and implementing control programs for weeds which cause major environmental problems;
- The implementation and monitoring of weed control programs on public and State-owned and Crown Land to ensure that objectives are achieved in an efficient and cost effective manner.
- An effective and efficient system for delivery of noxious weeds control and the enforcement of weeds legislation.

Community participation is supported and follow-up controls are integral to the plan to provide sustainable long-term benefits.

At the regional level, this plan covers the Sydney Metropolitan and Hawkesbury Nepean Catchment Management Authority (CMA) regions and assists in the implementation of the following Catchment Blueprints:

**5 Hawkesbury Lower Nepean Catchment Blueprint**, in particular:

Management Target 12: Weeds and pests:

*By 2006 implement adequately funded and closely linked strategies and effective actions plans for all major and potential terrestrial and aquatic weed/pest species; and*

Prioritised Management Actions for Biodiversity 6:

*Resource and implement closely linked strategies and effective action plans developed on a catchment basis for all major aquatic and terrestrial weeds and pests using environmentally appropriate management practices, and develop contingency plans for potential invasive weeds and pests.*

**6 Southern Sydney Catchment Blueprint**, in particular:

Management Target 14:

*By 2012 the threats posed to aquatic and terrestrial ecosystems by pest species are measurably reduced; and,*

Management Action 4:

*Implement closely linked strategies and effective action plans, supported by government for all major aquatic and terrestrial weeds, pests and pathogens using environmentally appropriate management practices, and develop contingency plans for potential invasive weeds and pests.*

**7 Sydney Harbour Catchment Blueprint**, in particular:

Management Action 33:

*Develop and implement integrated pest/weed/pathogen management plans for the Board area (aquatic and terrestrial).*

## 5.5 Barriers and Contingencies

The effective management of the Big Four Grasses can be achieved by implementing the Objectives and related Action Plans detailed in Section 6.0, thus overcoming the following contingencies and barriers.

Contingencies – future events that are likely to occur

- Ongoing demand for private property inspections and community education (Objective 4)
- Ease of spread of the weed, continual reinfestation and demand for follow up control work (Objectives 1,2,3,4)
- Discovery of new infestations across Sydney – public and private land (Objectives 1,2,3,4)
- Follow up control is needed to prevent re-invasion (Objectives 1 and 2)
- Commonly found along transport corridors (Objectives 1,2,3)
- Funding for weed control is spread thinly (Objective 1 and seek extra funding for control)

Barriers – what could get in the way of effective control

- Inconsistency of effective weed management between land managers (Objective 3, info sharing)
- Ease of spread of the weed and reinfestation (Objectives 1,2,3,4)
- Difficulty in identification of various grasses (Objectives 3 & 4, training)
- Funding for weed control is reduced (Objectives 1 & 2. Prioritise infestations and seek extra funding for control)
- Public perception of herbicide and chemical use (Objectives 3 & 4, training & promotion)
- Limited ability to do large scale control in habitat sensitive areas, areas where infestations provide bank stabilisation and dense thickets as habitat for native fauna (Objectives 1, prioritising areas)
- In ability to enforce control of the grasses, where not declared noxious (Objective 4, training & incentives)
- Disinterest of private landholders, who may not voluntarily control the grasses (that are not declared noxious) on their properties (Objective 4, training & incentives.)
- Difficulty to control in certain areas (Objective 1 & 2, prioritising areas)

## 6.1 ACTION PLAN – TUSSOCK PASPALUM

All 4 Action tables were revised May 2006

OBJECTIVE	ACTION	PERFORMANCE INDICATORS	By WHOM
1. To identify, inspect and record infestations and at risk sites. (ie sites that are at risk of having new incursions)	<ul style="list-style-type: none"> <li>- Identify at risk habitats (e.g. arterial road corridors)</li> <li>- Inspect at risk areas and record outcomes.</li> <li>- Set up community sightings database to record reported infestations.</li> </ul>	<ul style="list-style-type: none"> <li>- At risk sites and areas are inspected and identified in first year of plan.</li> <li>- Community sightings database set up in first year.</li> <li>- New incursions are recorded immediately and a control program is commenced within 1 week of detection.</li> </ul>	All participating LCA's
2. To strategically reduce infestations on public land and prevent	<ul style="list-style-type: none"> <li>- Small infestations are treated as part of existing bush regeneration programs, where appropriate</li> <li>- Supplement native planting at sites where natural regeneration is not likely to occur.</li> <li>- Calculate and report on the % reduction of small marginal infestations each year.</li> <li>- Undertake control of large core infestations gradually, providing for growth of native habitat.</li> <li>- Re-check treated infestations and treat areas for follow up</li> <li>- Ensure landowners control Tussock Paspalum on their properties. Follow up with Section 18 Notices if no action is taken within 3 months.</li> <li>- Trial various control methods</li> </ul>	<ul style="list-style-type: none"> <li>- A measurable % marginal infestations are controlled (<b>the % amount depends on each LCA's area of infestation and available resources</b>)</li> <li>- Core infestations are contained and prevented from spreading</li> <li>- Treatment sites are inspected and the progress is recorded each year</li> <li>- A measurable % reduction in the number of private property infestations</li> <li>- Control trial results published within 3 years</li> </ul>	All participating LCA's
3. To increase the awareness, identification and control skills among Council/state agency staff and contractors.	<ul style="list-style-type: none"> <li>- Develop Tussock Paspalum <i>WEEDeck</i> card</li> <li>- Teach identification skills to natural area and parks staff as part of in house training</li> <li>- Annual opportunity to share information about BMP and control techniques</li> <li>- Develop, publicise and encourage adoption of Weed Seed Spread protocols (eg. stock, soil, vehicle, and machinery hygiene practices)</li> </ul>	<ul style="list-style-type: none"> <li>- <i>WEEDeck</i> card developed and distributed to all stakeholders in the first year</li> <li>- 1 training day per LCA/small groups LCA's per annum</li> <li>- Annual field day to share information</li> <li>- Weed Seed Spread protocols developed and distributed in the first year</li> <li>- Protocols adopted by agency staff within 2 years</li> <li>- Protocols adopted by contractors by end of the plan</li> </ul>	All participating LCA's
4. To increase the awareness, identification and control skills among Bushcare/ Landcare volunteers and private landholders.	<ul style="list-style-type: none"> <li>- Encourage and train community volunteers and landholders to check and maintain their bushland areas and properties</li> <li>- Publicise and encourage adoption of weed seed spread protocols (eg. stock, soil, vehicle, and machinery hygiene practices)</li> <li>- Develop displays and educational material for field days and info stalls</li> </ul>	<ul style="list-style-type: none"> <li>- Community and Bushcare news articles published once a year for the life of the plan.</li> <li>- Conduct training workshops annually to teach identification skills (incorporate into existing plant Id workshops)</li> <li>- Weed Seed Spread protocols adopted by volunteers by end of the plan</li> </ul>	All participating LCA's Private landholders Volunteers

		- Educational material distributed at 3 field days/training days conducted across the region annually. Utilise Weedbuster Week to promote awareness and distribute information.	
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## 6.2 ACTION PLAN - CHILEAN NEEDLE GRASS

OBJECTIVE	ACTION	PERFORMANCE INDICATORS	OBJECTIVE
1. To identify, inspect and record infestations and at risk sites. (ie sites that are at risk of having new incursions)	<ul style="list-style-type: none"> <li>- Set up community sightings database to record reported infestations.</li> <li>- Record known infestations to determine at risk habitats</li> <li>- Inspect at risk areas and record outcomes.</li> <li>- Survey and map existing CNG infestations, in terms of density of invasion: <i>ie.</i> Low/Medium/High densities, as consistent with national criteria.</li> </ul>	<ul style="list-style-type: none"> <li>- At risk sites and areas are inspected and identified in first year of plan.</li> <li>- Community sightings database set up in first year.</li> <li>- New incursions are recorded immediately and a control program is commenced within 1 week of detection.</li> </ul>	All participating LCA's
2. To strategically reduce known infestations and prevent the spread	<ul style="list-style-type: none"> <li>- Undertake control of large infestations gradually, providing for growth of native habitat.</li> <li>- Small infestations treated as part of existing bush regeneration programs</li> <li>- Introduce native vegetation to replace treated CNG areas and areas threatened by its invasion</li> <li>- Re-check treated infestations and treat areas for follow up</li> <li>- Ensure landowners control CNG on their properties. Follow up with Section 18 Notices if no action is taken within 3 months.</li> <li>- Implement best management practices for CNG control, recommended at the state and national levels.</li> </ul>	<ul style="list-style-type: none"> <li>- A measurable % marginal infestations are controlled (<b>the % amount depends on each LCA's area of infestation and available resources</b>)</li> <li>- Core infestations are contained and prevented from spreading</li> <li>- Treatment sites are inspected and the progress is recorded each year</li> <li>- A measurable % reduction in the number of private property infestations</li> <li>- Control trial results published within 3 years</li> <li>- New CNG outbreaks are contained within 2 years</li> </ul>	All participating LCA's
3. To increase the awareness, identification and control skills among Council/state agency staff and contractors	<ul style="list-style-type: none"> <li>- Teach identification skills to natural area and parks staff as part of in house training</li> <li>- Develop an annual opportunity to share information about BMP and control techniques</li> <li>- Develop, publicise and encourage adoption of weed seed spread protocols (eg. stock, soil, vehicle, and machinery hygiene practices)</li> </ul>	<ul style="list-style-type: none"> <li>- Weed Seed Spread protocols developed and distributed in the first year</li> <li>- CNG profile sheet is developed for Sydney Weeds website within first year</li> <li>- Weeds Seed Spread protocols adopted by all LCA staff within 2 years</li> <li>- 1 training day per LCA/groups of 2-3 LCA's per annum. An annual field day/forum to share info</li> </ul>	All participating LCA's

<p>4. To increase the awareness, identification and control skills among Bushcare/ Landcare volunteers and private landholders.</p>	<ul style="list-style-type: none"> <li>- Encourage and train community volunteers and landholders to check and maintain their bushland areas and properties</li> <li>- Publicise and encourage adoption of weed seed spread protocols (eg. stock, soil, vehicle, and machinery hygiene practices)</li> <li>- Develop displays and educational material for field days and info stalls</li> <li>- Develop incentive schemes to encourage and assist landholders in removing CNG.</li> </ul>	<ul style="list-style-type: none"> <li>- Community and Bushcare news articles, published quarterly</li> <li>- Conduct training workshops annually to teach identification skills (incorporate into existing plant Id workshops)</li> <li>- Weed Seed Spread protocols adopted by non-LCA staff by end of the plan</li> <li>- Educational material distributed at 3 field days/training days conducted across the region annually</li> <li>- Movement of contaminated stock/ soil/fodder is prevented from entering designated clean areas</li> <li>- Utilise Weedbuster Week to promote awareness and distribute information.</li> </ul>	<p>All participating LCA's Private landholders Volunteers</p>
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### 6.3 ACTION PLAN – SERRATED TUSSOCK

<p>1. To identify, inspect and record infestations and at risk sites. (ie sites that are at risk of having new incursions)</p>	<ul style="list-style-type: none"> <li>- Set up community sightings database to record reported infestations.</li> <li>- Map known infestations to determine at risk habitats</li> <li>- Inspect at risk areas and record outcomes.</li> <li>- Survey and map existing ST infestations, in terms of density of invasion: <i>ie.</i> Low/Medium/High densities, as consistent with national criteria.</li> </ul>	<ul style="list-style-type: none"> <li>- At risk sites and areas are inspected and identified in first year of plan.</li> <li>- Community sightings database set up in first year.</li> <li>- New incursions are recorded immediately and a control program is commenced within 1 week of detection.</li> </ul>
<p>2. To strategically reduce known infestations and prevent the spread</p>	<ul style="list-style-type: none"> <li>- Undertake control of large infestations gradually, providing for growth of native habitat.</li> <li>- Small infestations treated as part of existing bush regeneration programs</li> <li>- Introduce native vegetation to replace treated ST areas and areas threatened by its invasion</li> <li>- Re-check treated infestations and treat areas for follow up</li> <li>- Ensure landowners control ST on their properties. Follow up with Section 18 Notices if no action is taken within 3 months.</li> <li>- Implement best management practices for ST control, recommended at the state and national levels.</li> </ul>	<ul style="list-style-type: none"> <li>- A measurable % marginal infestations are controlled (<b>the % amount depends on each LCA's area of infestation and available resources</b>)</li> <li>- Core infestations are contained and prevented from spreading</li> <li>- Treatment sites are inspected and the progress is recorded each year</li> <li>- A measurable % reduction in the number of private property infestations</li> <li>- Control trial results published within 3 years</li> <li>- New ST outbreaks are contained within 2 years</li> </ul>
<p>3. To increase the awareness, identification and control skills among Council/state agency staff and contractors</p>	<ul style="list-style-type: none"> <li>- Teach identification skills to natural area and parks staff as part of in house training</li> <li>- Develop an annual opportunity to share information about BMP and control techniques</li> <li>- Develop, publicise and encourage adoption of weed seed spread protocols (eg. stock, soil, vehicle, and machinery hygiene practices)</li> </ul>	<ul style="list-style-type: none"> <li>- Weed Seed Spread protocols developed and distributed in the first year</li> <li>- ST profile sheet is developed for Sydney Weeds website within first year</li> <li>- Weeds Seed Spread protocols adopted by all LCA staff within 2 years</li> <li>- 1 training day per LCA/groups of 2-3 LCA's per annum.</li> <li>- An annual field day/forum to share info</li> </ul>
<p>4. To increase the awareness, identification and control skills among Bushcare/ Landcare volunteers and private landholders.</p>	<ul style="list-style-type: none"> <li>- Encourage and train community volunteers and landholders to check and maintain their bushland areas and properties</li> <li>- Publicise and encourage adoption of weed seed spread protocols (eg. stock, soil, vehicle, and machinery hygiene practices)</li> <li>- Develop displays and educational material for field days and info stalls</li> <li>- Develop incentive schemes to encourage and assist landholders in removing ST.?? How to measure this, how much??</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Community and Bushcare news articles, published quarterly</li> <li>- Conduct training workshops annually to teach identification skills (incorporate into existing plant Id workshops)</li> <li>- Weed Seed Spread protocols adopted by non-LCA staff by end of the plan</li> <li>- Educational material distributed at 3 field days/training days conducted across the region annually</li> <li>- Movement of contaminated stock/ soil/fodder is prevented from entering designated clean areas</li> <li>- Utilise Weedbuster Week to promote awareness and distribute information.</li> </ul>

## 6.4 ACTION PLAN - COOLATAI GRASS

<p>1. To identify, inspect and record infestations and at risk sites. (ie sites that are at risk of having new incursions)</p>	<ul style="list-style-type: none"> <li>- Set up community sightings database to record reported infestations.</li> <li>- Map known infestations to determine at risk habitats</li> <li>- Inspect at risk areas and record outcomes.</li> <li>- Survey and map existing Coolatai infestations, in terms of density of invasion: <i>ie.</i> Low/Medium/High densities, as consistent with national criteria.</li> </ul>	<ul style="list-style-type: none"> <li>- Community sightings database set up in first year.</li> <li>- At risk areas identified and mapped in first year.</li> <li>- All at risks sites inspected and control programs developed in line with Objective 2 by end of second year.</li> </ul>
<p>2. To strategically reduce known infestations and prevent the spread</p>	<ul style="list-style-type: none"> <li>- Undertake control of large infestations gradually, providing for growth of native habitat.</li> <li>- Small infestations treated as part of existing bush regen programs</li> <li>- Introduce native vegetation to replace treated Coolatai areas and areas threatened by its invasion</li> <li>- Re-check treated infestations and treat areas for follow up</li> <li>- Ensure landowners control Coolatai Grass on their properties. Follow up with Section 18 Notices if no action is taken within 3 mths.</li> <li>- Implement best management practices for Coolatai control, recommended at the state and national levels.</li> </ul>	<ul style="list-style-type: none"> <li>- A measurable % marginal infestations are controlled (<b>the % amount depends on each LCA's area of infestation and available resources</b>)</li> <li>- Treatment sites are inspected and the progress is recorded each year</li> <li>- A measurable % reduction in the number of private property infestations</li> <li>- Control trial results published within 3 years</li> </ul>
<p>3. To increase the awareness, identification and control skills among Council/state agency staff and contractors</p>	<ul style="list-style-type: none"> <li>- Teach identification skills to natural area and parks staff as part of in house training</li> <li>- Develop an annual opportunity to share information about BMP and control techniques</li> <li>- Develop, publicise and encourage adoption of weed seed spread protocols (eg. stock, soil, vehicle, and machinery hygiene practices)</li> <li>- Develop Coolatai <i>WEEDeck</i> card</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Weed Seed Spread protocols developed and distributed in the first year</li> <li>- <i>WEEDeck</i> card developed and distributed to all stakeholders in the first year</li> <li>- Coolatai Grass profile sheet is developed for Sydney Weeds website within first year</li> <li>- Weeds Seed Spread protocols adopted by all LCA staff within 2 years</li> <li>- 1 training day per LCA/groups of 2-3 LCA's per annum.</li> <li>- An annual field day/forum to share info</li> </ul>
<p>4. To increase the awareness, identification and control skills among Bushcare/ Landcare volunteers and private landholders.</p>	<ul style="list-style-type: none"> <li>- Encourage and train community volunteers and landholders to check and maintain their bushland areas and properties</li> <li>- Publicise and encourage adoption of weed seed spread protocols (eg. stock, soil, vehicle, and machinery hygiene practices)</li> <li>- Develop displays and educational material for field days and info stalls</li> <li>- Develop incentive schemes to encourage and assist landholders in removing Coolatai.</li> </ul>	<ul style="list-style-type: none"> <li>- Community and Bushcare news articles, published quarterly</li> <li>- Conduct training workshops annually to teach identification skills (incorporate into existing plant Id workshops)</li> <li>- Weed Seed Spread protocols adopted by non-LCA staff by end of the plan</li> <li>- Educational material distributed at 3 field days/training days conducted across the region annually</li> <li>- Movement of contaminated stock/ soil/fodder is prevented from entering designated clean areas</li> <li>- Utilise Weedbuster Week to promote awareness and distribute information.</li> </ul>



## 7.0 MONITOR and REVIEW PROCESS

The performance of key stakeholders will be monitored through:

- “Agency Roundtable” reports in quarterly Regional Weed Committee meetings
- noxious weed group project co-ordination meetings twice annually
- information provided for noxious weed funding annual reports to DPI, specifically regarding progress towards the performance indicators.
- Regular progress meetings for this plan, to report back on work in progress and work scheduled, plan community education events, and to discuss problems incurred. The Minutes of all meetings held regarding this plan will be distributed to all participating councils and key stakeholders.
- The density and distribution of each grass species infestation will be measured both before and after treatment to audit the effectiveness of treatment(s) and the regional control programs.
- This Plan will be reviewed once every five years.

## 8.0 BENEFITS

Who will benefit from this plan and control of The Big Four grasses?

- Natural area managers – a better use of resources and reduction of demand on financial resources in the future
- Agricultural landowners
- Community – the public will have the opportunity to become more aware, pro active responsible.
- Ecological benefits for natural areas - the threat to biodiversity and bushland values will be reduced.
- Improved aesthetic values in the natural areas and roadsides where the grasses occur.
- With co-ordination and information sharing among Councils, funding and staff resources can be better utilised.

## 9.0 RESOURCES

Agriculture & Resource Management Council of Australia & New Zealand, Australian & NZ CRC for Weed Management & National Chilean Needle Grass Taskforce (2003). *Weed Management Guide for Chilean Needle Grass*.

CRC for Weed Management (2003). *Weed Management Guide for Serrated Tussock – Nassella trichotoma*.

Department of Environment and Conservation (2003). “*Invasion of native plant communities by exotic perennial grasses – key threatening process declaration*”. NSW Scientific Committee – final determination

Ens, Emilie-Jane (2002) “*Chilean Needle Grass (Nassella neesiana) on the Cumberland Plain. Expose of distribution and impact on invertebrates*”. Unpublished honours thesis (copy held at Mt Annan Botanic Garden).

Environment & Conservation Council and Forestry Ministers, (2000) *Weeds of National Significance Chilean Needle Grass (Nassella neesiana) Strategic Plan*. National Weeds Strategy Executive Committee, Launceston.

Environment & Conservation Council and Forestry Ministers, (2000) *Weeds of National Significance Serrated Tussock (Nassella trichotoma) Strategic Plan*. National Weeds Strategy Executive Committee, Launceston.

NSW Agriculture (2002) *Management for Coolatai Grass on the North West Slopes of NSW*.

Storrie A.M. & Lowien J.C. (2003). *Agnote - Chilean Needle Grass*. Dept of Primary Industries.