

# REGIONAL WEED MANAGEMENT PLAN

**PLAN TITLE:** Sydney West/Blue Mountains Regional Willow Management Plan

**1.2 PLAN PROPONENTS**

Regional Weeds Advisory Committee: Sydney West/Blue Mountains Regional Weeds Committee  
 Address: Blue Mountains City Council, PO Box 189 KATOOMBA 2780  
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 Signature: Chairman: . . . . . Date: . . . . .

**1.3 NAME OF PLANT(S)**

**WONS YES**

<u>Botanical name:</u>	<u>Common name:</u>
<i>Salix cinerea</i>	Grey Sallow, Pussy Willow
<i>Salix nigra</i>	Black Willow
<i>Salix fragilis</i>	Crack Willow

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

Starting date: 1/7/2002 Completion date: 30/06/2007

**1.5 AREA OF OPERATION:** Western Sydney / Blue Mountains Region including:

- |                               |                                |
|-------------------------------|--------------------------------|
| * Blue Mountains City Council | * Baulkham Hills Shire Council |
| * Blacktown City Council      | * Hawkesbury City Council      |
| * Penrith City Council        | * Parramatta City Council      |

**1.6 AIM:**

To minimise the severe modification to in-stream environments, and large scale disruption to water quality, ecological function, nutrient cycling, and natural biodiversity caused by the invasive Willows *Salix cinerea*, *Salix nigra* and *Salix fragilis*, by eradicating these species from all riparian habitats, rivers, creeks, wetlands and moist environments in the Blue Mountains and Sydney West Region.

**1.7 OBJECTIVES:**

1. To eradicate 100% of *Salix cinerea*, *S.nigra*, and *S.fragilis* infestations on public lands in the Blue Mountains / Sydney West region by June 2007;
2. To eradicate 50% of all *Salix cinerea*, *S.nigra*, and *S.fragilis* infestations on private lands in the Blue Mountains / Sydney West region by June 2007;
3. To ensure consistent declaration for *Salix cinerea*, *S. nigra*, and *S. fragilis* in all LCA's in the Blue Mountains / Sydney West Region by June 2003;
4. To gain effective participation of all stakeholders, including Catchment, Landcare, Bushcare & StreamWatch groups, and coordinate a consistent eradication response at catchment, land system, and ecosystem level;
5. To raise public awareness & encourage removal of above Willows on private property from June 2002;
6. To commence enforcing control of above Willows on private land from September 2003;
7. To target Willow infestations with the potential to spread into environmentally sensitive or remote areas, and catchments disturbed by the 2001/2 bushfires, on a priority first basis;
8. To encourage natural regeneration wherever possible, or replace Willows with appropriate native species, over the five year plan period;
9. To support any NSW Agriculture or other agency research programs and trials seeking new or improved control methods for Willow control along waterways, including biological controls.

## 2.0 Stakeholders

Signatories	Other stakeholders
Blue Mountains City Council	Blue Mountains Local Weeds Committee, comprising: <ul style="list-style-type: none"> <li>▪ Blue Mountains City Council (BMCC)</li> <li>▪ National Parks &amp; Wildlife Service- Blue Mountains Region</li> <li>▪ NSW Urban Runoff Control Program (URCP)</li> <li>▪ Sydney Catchment Authority (SCA)</li> <li>▪ Sydney Water</li> <li>▪ Roads &amp; Traffic Authority (RTA)</li> <li>▪ Rail Infrastructure Corporation (RIC)</li> <li>▪ Blue Mountains Conservation Society (ConSoc)</li> </ul>
Parramatta City Council	
Hawkesbury River County Council, comprising: <ul style="list-style-type: none"> <li>▪ Baulkham Hills Shire Council</li> <li>▪ Blacktown City Council</li> <li>▪ Hawkesbury City Council</li> <li>▪ Penrith City Council</li> </ul>	
	DLWC – Windsor Office - Riverbank Management Program
	Cox’s River Catchment Management Committee
	Lithgow Oberon Landcare Association
	Upper Parramatta River Catchment Management Trust
	Minnehaha Falls Landcare Group
	Megalong Valley Progress & Sporting Association
	Mount Wilson Progress Association
	Blue Mountains Bushcare Network
	National Parks and Wildlife Service- Sydney West Region
	CSIRO Forestry & Forest Products - Kurt Cremer

## 3.0 Background

Willows frequently dominate creek environments causing severe modification to the in-stream environment and large-scale disruption to water quality, ecological function, nutrient cycling and loss of associated fauna. The shade density of Willow species, thick root mat, and presence of salicylic acid, eliminates the establishment of other plant species, reducing habitat values and natural biodiversity.

Certain *Salix* species (Pussy Willow - *Salix cinerea*, Black Willow - *S. nigra*, Crack Willow - *S. fragilis*) have been identified as among the most threatening recent weed incursions into the Blue Mountains and Sydney West region.

These species have demonstrated a potential to invade and monopolise habitats in all areas of the region, from tidally fluctuating brackish waters of the Hawkesbury and Parramatta Rivers (*S. fragilis*); to riparian habitats along the Nepean, Grose, MacDonald, Colo and Parramatta Rivers (*S. nigra*); and cool temperate creeks, wetlands, and hanging swamps on all catchments flowing into the Grose and Jamison Valleys of the World Heritage Listed Greater Blue Mountains National Park (*S. cinerea*).

Willows are listed as a Weed of National Significance. While there are many other riparian weeds of environmental significance, none reach the size of Willows, form quite such effective barriers to water flow, have such a potential to invade undisturbed remote natural wilderness areas of the World Heritage Listed Greater Blue Mountains National Park, or are quite so easy to control.

Eradication of these *Salix* species has been identified as a high priority ecological outcome for public and private lands in the Blue Mountains and Sydney West region. The disturbance caused by the 2001/2 bushfires has added to the urgency, with huge areas of remote wilderness now highly prone to further invasion from existing *Salix* populations during the next seeding period in mid-Spring 2002.

Participating stakeholders have already been active in treating Willows in a number of catchments, effective controls are available, and total eradication is feasible on public land within 5 years.

Regulatory support will be necessary if Willow control outcomes on private land are to be consistent with those on public land. An upgrade of *S. cinerea*, *S. nigra* and *S. fragilis* from W4g to W2 will be required.

### 3.1 Rationale

There is concern about the spread of Willows as weeds in Australia, and in particular about Pussy Willow (*Salix cinerea*), Black Willow (*S. nigra*) and Crack Willow (*S. fragilis*). (Cremer, 1999, 2000) Since its introduction into Australia in 1962, *Salix nigra* has proved to spread aggressively along rivers. The seed of *S. nigra* & *S. cinerea* are spread by wind for more than 50km. Branches of all three species break off readily and take root, and germination and growth is rapid on bare wet sites.

These populations are almost certain to spread into inaccessible areas of the World Heritage Listed Greater Blue Mountains National Park, and will in a few decades come to dominate most riparian and wet environments. The Mount Hall bushfires of 2001/2 have provided an unwelcome boost for the potential rapid spread of *S. cinerea*, from Wentworth Falls-Glenbrook south to Warragamba Dam.

To address the weed issues associated with a large weed tree that spreads by seed up to 50km down wind, and vegetatively many kilometres downstream, requires a coordinated regional control plan.

All Plan stakeholders in the Blue Mountains/Sydney West region are currently undertaking Willow control, with considerable success in some locations. Limited resources have prevented a coordinated regional approach. This Plan aims to address the issues involved, and put in place a 5 year coordinated weed control program for *S. cinerea*, *S. nigra* and *S. fragilis*

### 3.2 Description of Problem

The Willows *Salix cinerea*, *S. nigra* and *S. fragilis* impact on weed management in the Blue Mountains/Sydney West Region in 3 major ways:

1. The City of the Blue Mountains lies entirely within the Sydney drinking water catchment;
2. World Heritage Listing was specifically based on the floristic diversity of the BM area;
3. The local economy is dependent on natural area values and eco-tourism.

1. Willows are large (6m) invasive fast growing trees that will dominate creeks, swamps and moist forest. They cause blockages of streams, shallow channels, flooding, erosion, and development of mid-stream 'islands' of sediment. They reduce the temperature and dissolved oxygen in the water, and promote the growth of blue-green algal blooms.

The City of the Blue Mountains lies within the drinking water supply of the Greater Sydney Basin. Council has an obligation to manage weeds on its land for water quality as well as other purposes.

2. The shade created by the canopy of Willows is far more dense than that of native trees. This dense shade can displace virtually all native plants, reducing the available habitat, nesting sites and food sources for native birds, animals, insects and reptiles.

The 1,032,649 hectare Greater Blue Mountains World Heritage Area was listed specifically because of its floristic diversity. It contains of 96.8% eucalypt vegetation, ranging through all structural types from tall wet forest to dry mallee shrubland (this is an exceptional characteristic); 91 Eucalypt species (13% of global total); 69 major Eucalypt communities; 114 endemic and 120 nationally rare or threatened plant species; and evolutionary relics such as the Wollemi Pine and *Microstrobos fitzgeraldii*.

Some Threatened Animal Species listed under the Commonwealth EPBC Act (1999) for the Blue Mountains region and potentially affected by Willows include the Blue Mountains (Water) Skink (*Eulamprus leurensis*), Giant Dragonfly (*Petulura gigantea*), Giant Barred Frog (*Mixophyes iterates*) and Sooty Owl (*Tyto tenebricosa*). Some Threatened Plant Species potentially affected include the Greenhood Orchid (*Pterostylis pulchella*) and Nepean River Gum (*Eucalyptus benthamii*). Some Significant Habitats potentially affected include *Eucalyptus sclerophylla* Alluvial Bench Woodland, Blue Mountains Creekline Vegetation, Blue Mountains Swamps, and Lagoon Vegetation (Glenbrook Lagoon).

Council has a statutory and ethical obligation to manage weeds for biodiversity conservation and ecosystem function, as well for economic, human health, and other purposes.

### 3.3 Distribution of Infestation

#### Black Willow

Since its introduction into Australia in 1962, *Salix nigra* has spread aggressively along rivers. Viable seed is spread by wind for more than 50km, branches break off readily and take root, and germination and growth is rapid on bare wet sites.

Some 50km of the Colo, 26km of the Hawkesbury-Nepean, 26km of the Grose, 42km of Cattai, large sections of the Wingecarribee and Wollondilly Rivers, and numerous small tributaries in the lower Blue Mountains are heavily infested by *Salix nigra*.

#### Pussy Willow

*Salix cinerea* has invaded both disturbed and undisturbed situations on all major drainage lines of the upper Grose and Jamison Valleys of the Blue Mountains. It is so aggressive that it has even become a common weed of roadside drains.

An estimated 57ha has been recorded by BlueSpace Weed Mapping, in the following bushland areas:

- Leura Falls and Gordon Falls, Leura
- Fitzgeralds Creek, Mount Riverview
- Upper Kedumba Creek, MiniHaHa Falls, and Frank Walford Reserve, Katoomba
- Popes Glen and Braeside, Blackheath
- Jamison Creek and Wentworth Falls Lake, Wentworth Falls
- Lower mountains at Hazelbrook Creek, Blaxland and Woodford

A much larger area is known to exist, but is yet to be mapped, on urban and private land along the main Blue Mountains plateau, the Grose Valley, and along the Cox's River in the Megalong Valley.

These populations are almost certain to spread into the World Heritage Listed Greater Blue Mountains National Park, and will in a few decades come to dominate most of the riparian and wet environments. The Mount Hall bushfires of 2001/2 have provided an unwelcome boost for the potential rapid spread of *S. cinerea* along a 54km front, from Wentworth Falls-Glenbrook south to Warragamba Dam.

#### Crack Willow

*Salix fragilis* is a major weed in riparian habitats on the lower reaches of the Hawkesbury River and other parts of the Blue Mountains / Sydney West region.

At this stage Crack Willow it is only spreading downstream, unlike the seeding willows *S. cinerea* and *S. nigra*, which are expanding their range upslope and upwind. However, live stems of *S. fragilis* can take root on poorer seedbeds than seeded willows. Hybrids of *S. fragilis* and *S. babylonica* have occurred near the junction of Hawkesbury and Grose Rivers. Increasing urbanisation and associated higher stormwater runoff, peak flows, flash flooding, and silt loads in the Blue Mountains/Sydney West region are providing ideal conditions for further spread of *S. fragilis* beyond its current range.

### 3.4 Weed Biology/Ecology

*S. cinerea*, *S. nigra* and *S. fragilis* are large fast growing deciduous trees. A seedling can grow to 2 metres in 12 months, produce seed after 2–4 years, and reach full size of about 6metres in 15 years. *S. cinerea* and *S. nigra* spread by wind blown seed many kilometres from a parent tree. All have fragile branches and can spread vegetatively by layering and by detached branches taking root.

**Flowers** are egg shaped catkins and occur on separate male and female plants. The “fluff” from female trees, produced in mid-spring, contains tiny seeds which are spread by wind and water. Pollination is by insects. Seed remains viable for only a short time. There is no soil seed-bank problem after tree removal.

Willows are frost tolerant, reasonably drought tolerant once established, sucker or coppice profusely when damaged, and trees destroyed by fire have been observed to regrow from suckers. While fire may keep height growth in check, the number of stems is likely to be multiplied many fold.

### 3.5 Habitat

Willows can flourish wherever there is shallow permanent (or near-permanent) water, tolerate acidity down to pH 3.0, spread faster in areas disturbed by clearing or road construction, but can also invade undisturbed moist native forest, wetlands and hanging swamps.

*S. nigra* favours riparian habitats along the upper reaches of the Plan Region, including the Nepean, Grose, MacDonal and Colo Rivers;

*S. cinerea* favours cooler temperate areas of the Plan Region above 700m altitude along creeks, wetlands, and hanging swamps on all catchments flowing into the Grose and Jamison Valleys. It has been observed to germinate and grow amid thick stands of Cumbungi (*Typha sp*) in dams, to spread along roadside drains, and gradually creep up hillsides.

*S fragilis* favours the lower reaches of the Plan Region, including tidally fluctuating brackish waters of the Hawkesbury and Parramatta Rivers, and Cattai Creek.

### 3.6 Method and Rate of Spread

Black Willow (*Salix nigra*) was introduced into Australia in 1962 as part of trials to better utilise wetter sites in Poplar plantations. It is believed that these plantings started the main natural spread on the Nepean, Colo, Macdonald & Cattai Rivers. It spreads aggressively from seed and rooted branches.

Pussy Willow (*Salix cinerea*) was probably initially spread by deliberate plantings, but since then has spread by seed (wind & water), layering and detached rooted branches.

Crack Willow (*Salix fragilis*) is one of the most abundant and widespread willows in Australia. Because live branches break off so easily and then take root, this species spreads aggressively downstream along rivers. It is not known to produce viable seed at this stage.

### 3.7 Roles and Responsibilities of Land Managers

Land Manager	Responsibilities
Blue Mountains City Council	Administer Noxious Weeds Act 1993 Comply – Native Vegetation Conservation Act 1997 Comply - Pesticides Act 1999 Comply – Clean Waters Act Comply - PoE Act Comply - Threatened Species Conservation Act 1995 Comply – Commonwealth EPBC Act Comply - Wilderness Act Comply Commonwealth World Heritage charter
Hawkesbury River County Council <ul style="list-style-type: none"> <li>▪ Baulkham Hills Shire Council</li> <li>▪ Blacktown City Council</li> <li>▪ Hawkesbury City Council</li> <li>▪ Penrith City Council</li> </ul>	Administer Noxious Weeds Act 1993 Comply – Native Vegetation Conservation Act 1997 Comply with PoE Act Comply - Pesticides Act 1999 Comply – Clean Waters Act Comply - PoE Act Comply - Threatened Species Conservation Act 1995 Comply - EPBC Act
Parramatta City Council	Administer Noxious Weeds Act Comply – Native Vegetation Conservation Act 1997 Comply - Pesticides Act 1999 Comply – Clean Waters Act Comply - PoE Act Comply - Threatened Species Conservation Act 1995 Comply - EPBC Act

## 4.0 Regulatory Situation

### 4.1 Current Declaration

**BMCC: W4g** – The weed must not be sold, propagated or knowingly distributed

**HRCC: W4g** - The weed must not be sold, propagated or knowingly distributed

**PCC : W4g** - The weed must not be sold, propagated or knowingly distributed

Permits are required from DLWC under the Native Vegetation Conservation Act 1997 for any works on vegetation (weed or native) on public or private land in riparian zones within 20m of a stream.

Willows less than 10m are exempt under BMCC's Tree Preservation Order. No formal application or permit is required for the removal of Willows on private property less than 10m in height.

### 4.2 Declaration Changes

**BMCC:** Proposal to upgrade *Salix cinerea* and *S. nigra* to **W2** being submitted to NWAC shortly.

Representations will be made to the NWAC to introduce consistent declarations for *S. cinerea*, *S. nigra* and *S. fragilis*, preferably an upgrade from W4g to W2 on a state wide basis, or otherwise throughout the Blue Mountains/Sydney West Region.

### 4.3 Enforcement Strategy

- W4g and minimal at present.
- If NWAC approval for a W2 Category is granted, enforcement will be in accordance with Sections 12, 13 and 14 of the Noxious Weeds Act 1993.

## 5.0 Considerations and Opportunities

- Over 100 Bushcare, Landcare, Catchment and Stream Watch groups exist in the region and may be enlisted to strategically target high biodiversity sites. Willow infestations are routinely controlled by Bushcare and Catchment groups on 13 catchments in the Blue Mountains, along the Hawkesbury-Nepean, Grose, MacDonald, Parramatta, and Cattai Rivers in western Sydney.
- The Upper Parramatta River Catchment Trust and DLWC are currently funding four constituent Councils to systematically remove Willows, including *S. babylonica* from Toongabbie, Blacktown, Darling Mills and Hunt Creeks as well as the Parramatta River.
- Hawkesbury River Catchment Committee (HRCC), DLWC, ET , and LGAG funding has resulted in 42km of Black Willow control complete for the Cattai River, 50km complete for Black Willow on the Colo River, 26km continuing Black and Crack Willow control for the Hawkesbury-Nepean River, 25km of Black Willow planned for the Grose River, and work continuing for the MacDonald River.
- The NSW Urban Runoff Control Program (URCP) is currently calling for tenders from Bush Regeneration Contractors to control *Salix nigra*, *S. cinerea* and *S. purpurea* on 14 catchments across the Blue Mountains before the next Willow seeding in November 2002.
- Blue Mountains City Council will be implementing the Megalong Valley Weed Management Strategy during 2002/3, which will provide opportunities to raise Willow awareness among farmers and small landholders along this section of the Cox's River.
- Displays as part of the Great Gorse Walk, World Environment Day, Upper Kedumba Creek Catchment Day, and Weedbuster Week will provide opportunities to promote Willow awareness.
- Care, follow-up control, and monitoring will be needed to ensure Willows are not replaced by more aggressive weed species, to minimise the potential erosion by incorporating appropriate revegetation practices where necessary, and to minimise off-target damage to native species.

## 5.1 Opportunities to be Exploited

- Timely completion of the BlueSpace Weed Mapping Project of *Salix sp* on Council bushland, urban bushland interface Crown land, and National Park in the Blue Mountains in 2001 will direct Willow eradication activities and determine the extent of the project in the Blue Mountains LCA.
- Council's Weed Management Strategy and Action Plan was advertised for comment and adopted by Council in November 2001. It establishes the priorities and direction of Council's weed management activities for the foreseeable future.
- The Weed Management Strategy 2001 includes a Council recommendation to review the current Noxious Weeds List and prepare a submission to the NWAC recommending the upgrade of *Salix cinerea* and *Salix nigra* from W4g to W2.
- The Mount Hall bushfires of 2001/2 have disturbed large areas of remote wilderness in the Blue Mountains National Park from Wentworth Falls – Glenbrook and south to Warragamba Dam. These areas are now highly prone to invasion by *Salix cinerea* and *Salix nigra* after the next seed fall in November 2002. The establishment of this project will provide a timely response to a potentially very serious expansion of Willows into inaccessible wilderness areas.
- The Urban Runoff Control Program has funded on-going bush regeneration works at 14 sites in the Blue Mountains between Lapstone and Blackheath. This funding ceases from June 2003. Targeted *Salix* occur on a number of these sites. The establishment of a systematic regional Willow control program will enable urgently needed follow up Willow control at these 14 sites.
- The establishment of this program will provide timely funding support to continue Willow control works commenced by the Hawkesbury Nepean Catchment Trust, Upper Parramatta River Catchment Trust, Urban Runoff Control Program, Landcare, Bushcare & Catchment Care groups.
- Significant local knowledge and experience in Willow control will enable the program to proceed immediately, virtually the whole year round, once funding is approved.
- The purchase by Blue Mountains City Council of Sidewinder Trunk Injection equipment in 2002 will enable faster, cleaner, safer and more efficient treatment of tree weeds including *Salix*.

## 5.2 Industry Sector

Natural area values, the quality of the wilderness experience, and eco-tourism are the lifeblood of the local Blue Mountains economy. The highly discerning eco-tourism market demands a quality product, or customers will go elsewhere.

Invasive exotic weeds such as Willows encroaching into pristine wilderness areas, suffocating native plants, impeding recreational movement, and visually detracting from the "naturalness" of the Blue Mountains experience are potentially very damaging to the local economy as well as the environment.

- Agriculture, particularly Horse riding, Beef cattle, Goats, and Orcharding
- Recreational activities eg. Horseriding, canoeing, bushwalking, abseiling, canyoning
- Nurseries

### 5.3 Ecological

The Willows *Salix cinerea*, *S. nigra* and *S. fragilis* impact on the ecology of the Blue Mountains in a number of ways:

1. Water quality, nutrient cycling, and hydrological processes;
2. Floristic and fauna biodiversity;
3. Ecosystem integrity and function;
4. Threatened species, vegetation communities, and habitats;
5. Environmental sustainability.

#### Water Quality Issues:

- Willows are large (6m) invasive fast growing trees that dominate creeks, swamps & moist forest;
- Willows can cause blockages of streams, shallow channels, flooding, erosion, and development of mid-stream 'islands' of sediment;
- Willows can reduce the temperature and dissolved oxygen content of water, and promote the growth of blue-green algal blooms;
- Willows can alter natural water table levels and sub-surface drainage patterns;
- Willow leaves leach high concentrations of Salicylic acid into soil and water, which can alter in-stream and soil macro-invertebrate populations, with subsequent impact on birds, reptiles and other animals dependent macro-invertebrates for food.

The City of the Blue Mountains lies within the drinking water supply of the Greater Sydney Basin, and Council has an obligation to manage weeds on its land for water quality as well as other purposes.

#### Biodiversity Issues

The shade created by the canopy of Willows is far more dense than that of native trees, and can displace virtually all native plants. This reduces biodiversity and ecological integrity of natural habitats, availability of nesting sites, and food sources for native birds, animals, insects & reptiles.

The 1,032,649 hectare Greater Blue Mountains World Heritage Area was listed specifically because of its floristic diversity. It contains:

- 96.8% eucalypt vegetation, ranging through all structural types from tall wet forest to dry mallee shrubland (this is an exceptional characteristic);
- 91 Eucalypt species (13% of global total);
- 69 major Eucalypt communities;
- 114 endemic and 120 nationally rare or threatened plant species;
- Evolutionary relics such as the Wollemi Pine and *Microstrobos fitzgeraldii*.

Some Threatened Species listed under the Commonwealth EPBC Act (1999) for the Blue Mountains region and potentially affected by Willows include:

- Fauna species:
  - the Blue Mountains (Water) Skink (*Eulamprus leurensis*),
  - Giant Dragonfly (*Petolura gigantea*),
  - Giant Barred Frog (*Mixophyes iterates*) and
  - Sooty Owl (*Tyto tenebricosa*).
- Plant Species:
  - the Greenhood Orchid (*Pterostylis pulchella*)
  - Nepean River Gum (*Eucalyptus benthamii*).
- Significant Habitats potentially affected by Willows include:
  - *Eucalyptus sclerophylla* Alluvial Bench Woodland,
  - Blue Mountains Creekline Vegetation,
  - Blue Mountains Swamps, and
  - Lagoon Vegetation (Glenbrook Lagoon).

Council has a statutory as well as an environmental obligation to manage weeds for biodiversity conservation and ecosystem function as well as for economic, human health and other purposes.

## 5.4 Species Management

Bush regeneration techniques as opposed to high volume spraying, bulldozing or wholesale chainsaw clear-felling provide the only available feasible methods for the control of Willows in the remote and inaccessible bushland and riparian areas where they currently occur in the region.

Bush regeneration techniques are the best suited to accurate Willow identification, to achieve lasting control, to minimise off-target damage to native species, to protect water quality, to minimise the risk of secondary weed succession, and to reduce the potential for subsequent erosion.

## 5.5 Community

Over 100 Bushcare, Landcare, Catchment and Stream Watch groups exist in the region and may be enlisted to strategically target high biodiversity sites.

Willow infestations are routinely controlled by Bushcare and Catchment groups on 13 catchments in the Blue Mountains, and on the Hawkesbury-Nepean, Grose, MacDonald, Parramatta, and Cattai Rivers in western Sydney.

## 5.6 Extension and Education

- Blue Mountains City Council employs a Weed Education Officer to encourage the establishment of Bushcare type weed control cooperative weed control programs on privately owned land, and to encourage farmers in the Megalong Valley to develop property plans for noxious weed control.
- Blue Mountains City Council will be implementing the Megalong Valley Weed Management Strategy during 2002/3, which will provide opportunities to raise Willow awareness among farmers and small landholders along this section of the Cox's River.
- Staff will man displays for the Great Gorse Walk, World Environment Day, Upper Kedumba Creek Catchment Day, Weedbuster Week, which will provide opportunities to raise Willow awareness.

## 5.7 Links to other Strategies

- This Plan is linked to 15 Local and Regional Noxious Weed Control Plans
- National Weed Strategy (WONS) – Willows
- BMCC Weed Management Strategy and Action Plan 2001

## 5.8 Contingencies

- Increase private property inspection
- Increase herbicide spraying of urban and roadside willow infestations
- Increase bushland and riparian corridor Willow target weeding outcomes
- Increase off-spray season on ground weed control outcomes

## 5.9 Barriers

- DLWC Permits are required under the Native Vegetation Conservation Act 1997 for any works on vegetation (weed or native) on public or private land in riparian zones within 20m of a stream
- Lack of funding and resources
- Lack of NRA Permit for herbicide use on a waterway
- Lack of a biological control agent
- Possible resistance from landholders
- Inaccessibility and remoteness of infestations
- Potential increased stream velocity after removal and erosion,
- Potential for secondary weed succession of more serious weeds after Willow removal
- Potential off-target damage
- Threatened species, vegetation communities, and habitats

## 6.0 Performance Indicators and Actions

ACTION PLAN FOR CONTROL	Performance Indicator	Action	Who
Determine full extent of areas of willow in the LGA not already mapped by Blue Space	Surveys completed and Data entered onto Blue Space Weed Mapping Program	Aerial/ground survey of Megalong Valley  Survey urban areas  Survey Private Property	LCA
Reduce spread and distribution	Completion of works program	Allocate a minimum of 2000 manhours to the control of Willows on public land	L.C.A Contractor
Private property inspections	Carry out 200 inspections for Salix annually	Conduct property inspections Enforce Noxious Weeds Act	L.C.A
Public awareness	On-going	Attend 4 field days, man 8 displays	L.C.A

## 7.0 Monitors and Review Process

- On-going public and private land inspections by Noxious Weeds Inspectors
- Customer Service Requests, Councillor Requests, Bushcare/Landcare/Catchment Care requests
- Plan to be reviewed annually in April

## 8.0 Benefits

- Implement timely action while it is still economically feasible to eradicate Willows from region
- Reduce decline in water quality and stream hydrology
- Protect flora & fauna diversity, ecosystem integrity, and ecological function
- Protect Rare and Threatened species, vegetation communities and habitats
- Meet LCA Statutory requirements under the Noxious Weeds Act, TSC Act, PoE Act, EPBC Act
- Increase community awareness and responsibility
- Provide support for community Bushcare, Catchment Care and other programs
- More efficient, coordinated and systematic utilisation of resources
- A coordinated and systematic program at catchment, natural land system, and ecosystem level, rather than a localised reactive uncoordinated program based on artificial LCA boundaries.

## 9.0 Resources

BMCC	Noxious Weeds Fact – Pussy Willow, Grey Sallow ( <i>Salix cinerea</i> ) 2001
BMCC	Blue Space Weed Mapping Project 2001
BMCC	Weed Management Strategy and Action Plan 2001
NSW Agric	Willow Control - Bob Trounce, Kurt Cremer 1997 Willow Identification for River Management in Australia – KW Cremer 1995
WONS	Willows are listed as one of the 20 Weeds of National Significance
UBBS 1997	Urban Bushland Biodiversity Survey of Western Sydney - NPWS

### LGA Resources

#### Blue Mountains City Council

- Stuart James - Bushland Management Officer
- Lynton Auld - Urban Runoff Control Program + Bush Regeneration Contract Supervisor
- Chris Dewhurst - Bushcare Coordinator + 3 Part-time Bushcare Officers
- Chris Jonkers - Weed Management Coordinator
  - Weed Education Officer P/T
  - 3 full time Bush Regenerators + 2 Jobshare
  - 3 full time Weed Controllers/Inspectors + 2 Temporary Weed Controllers

#### Hawkesbury River County Council

- David Karlson - 2 full time Weeds Inspectors
- 3 full time Weeds Officers

#### Parramatta City Council

- Phil Murphy - Noxious Weeds/Bushland Officer
- 2 Bushland Officers
- 1 Part-time Restoration Officer

#### Baulkham Hills Shire Council

- Virginia Bear - Bushland Manager
- + 1 Bushland Staff

#### Penrith City Council

- Marlene Spinks - Bushland Officer

#### Blacktown City Council

- Helen Adams - Parks Operations Officer
- 3 Bush Regeneration staff

#### Hawkesbury City Council

- Michelle Engelhard - Land Management Officer

#### Department of Land and Water Conservation

- Patricia Chadwick - Willows Project Officer – Riverbank Management Program

#### National Parks & Wildlife Service – Blue Mountains Region

#### Hawkesbury Nepean Catchment Management Trust

#### Upper Parramatta Catchment Management Trust

#### Cox's River Catchment Management Committee

#### Blue Mountains Bushcare Network – 35 Bushcare Groups and 600 volunteers

#### Lithgow Oberon Landcare

#### Megalong Valley Progress & Sporting Association

#### Mount Wilson Progress Association

