1.0 Cover Page

NSW DEPARTMENT OF PRIMARY INDUSTRIES

REGIONAL WEED MANAGEMENT PLAN

1.1 Plan Title: ***Riverina Black Willow Management Plan* revised 2006** **No. XXX**

1.2 Plan Proponents / Applicant Contact Details

Regional Weeds Advisory Committee: Eastern and Western Riverina Noxious Weeds Advisory Groups

Address: C/- Greater Hume Shire Council, PO Box 382, JINDERA NSW 2642

Contact person: Paula Ash

Telephone number: 6026 3800..... Facsimile number: 6026 3957

Email address: pash@greaterhume.nsw.gov.au

Signature: Eastern Group Representative:. . . . . Date: . . . . . .

Signature: Western Group Representative: . . . . . Date: . . . . . .

1.3 Name of Plant(s) WONS - Yes

Scientific name: Salix *nigra* Common name: Black willow

1.4 Plan Period

Starting date: 01/07/2007 Completion date: 30/06/2012

1.5 Area of Operation:

Region 5, extending from Tumut in the east to Wentworth/ S.A border in the west and Carrathool in the north to the Murray River in the South. The Local Control Authorities and Rural Land Protection Boards this region encompasses are all representatives of the Eastern and Western Riverina Noxious Weeds Advisory Groups (**E/WRNWAG**). The region extends across 4 Catchment Management Authority (CMA) areas, being Murray, Murrumbidgee, Lower Murray Darling and the Lachlan.

1.6 Aim: To fully and continuously suppress and destroy Black willow from the Riverina region to protect waterways and the general environment.

1.7 Objectives:

a. Ongoing monitoring of eradicated BW from Gocup/Tumut plantations.

b. Ongoing monitoring and treatment of all new germinations of all treated heavy seed bearing (core) Black willow infestations, Oak Creek, Adelong Creek, Blowering Dam (Western foreshore), Bombowlee Creek, Goobarragandra River and Gilmore Creek; starting at the top of the Murrumbidgee catchment and working down, by the end of the plan period.

c. Remove all scattered (marginal) Black willow infestations, Tarcutta Creek, Umbango Creek and Murrumbidgee River at Gundagai; starting at the top of the Murrumbidgee catchment and working down, by the end of the plan period.

d. Locate rare and isolated and identify new Black willow infestations (seedlings) to be treated within 1st year of discovery.

e. All land managers, including government agencies, and the general public given further opportunity to attain identification skills and an understanding of the potential problems Black willow can cause while learning the appropriate management practices for its eradication.

2.0 STAKEHOLDERS

2.1 Signatories

The following Local Control Authority (**LCA**) members of the Eastern and Western Riverina Noxious Weeds Advisory Groups (**E/WRNWAG**): Albury City, Balranald Shire, Bland Shire, Carrathool Shire, Central Murray County, Coolamon Shire, Cootamundra Shire, Corowa Shire, Greater Hume Shire, Griffith City, Gundagai Shire, Hay Shire, Jerilderie Shire, Junee Shire, Leeton Shire, Lockhart Shire, Murrumbidgee Shire, Narrandera Shire, Temora Shire, Tumbarumba Shire, Tumut Shire, Urana Shire, Wagga Wagga City, Wakool Shire, Wentworth Shire, Balranald RLPB, Gundagai RLPB, Hay RLPB, Hume RLPB, Murray RLPB, Narrandera RLPB, Riverina RLPB, Wagga Wagga RLPB and Wentworth RLPB.

2.2 Other Stakeholders

LCA and RLPB members of the Eastern and Western Riverina Noxious Weeds Advisory Groups (**E/WRNWAG**). The Noxious Weeds Advisory Committee (**NWAC**), NSW Department of Primary Industries (**NSW DPI**), Department of Lands (**DoL**), Black Willow Working Group (**BWWG**) – now Riverina Highland Weeds Working Group (**RHWWG**), Snowy Hydro Limited (**SHL**), Wee Jasper Rivercare Group (**WJRC**), Riverina Highlands Landcare Network (**RHLN**), Tarcutta Creek Catchment Landcare Group (**TCLC**), Murrumbidgee / Murray / Lower Murray Darling / & Lachlan Catchment Management Authorities (**CMA**), Greening Australia (**GA**), NSW Department of Environment and Conservation (**DEC**), water suppliers (**WS**) e.g. Riverina Water County Council / Murrumbidgee Irrigation and the National Willow Taskforce (**NWT**).

3.0 BACKGROUND and JUSTIFICATION

3.1 Plan Justification and Description of the Problem

Black willow (*salix nigra*) was imported as seed collected in 1962 near the lower Mississippi River, USA. These seeds were then planted by the then Snowy Mountains Authority (SMA) at three locations near Tumut, the largest being at Gocup. Offspring from these original plantings have now been located 50–100km away from their parents, establishing from seed blown from the Tumut plants. The major problem now is spread by wind and water dispersed seed from the offspring.

We are in the process of updating the original Black willow map from 2002 (Appendix 1). Heavy seed bearing infestations occurred in the Tumut Shire within approximately 40km of the original plantings at Gocup and Tumut plains. These being: the plantation sites, along Adelong creek, Bombowlee Creek, Gilmore Creek, Goobarragandra River and the foreshores of Blowering Dam. All known heavy infestations on private property and council lands in Tumut Shire have been treated over the last 4-5 years. Ongoing inspections continue to find seedlings; these are being treated as found. Scattered infestations are located along Oberne and Tarcutta creeks and the Murrumbidgee River at Gundagai. Isolated infestations are located at Borambola, Kosciuszko National Park and State Forests.

Considering the spread of Black willow in this region since its introduction, there is a serious and urgent need to continue in eradicating this species before it infests other areas. Where it is currently found (see above) in streams and roadside ditches, it is forcing flows against stream banks and causing erosion. Its fragile branches are also breaking off and either taking root or blocking flows downstream. Debris and sediment is trapped and builds up around willows growing midstream, as well as diverting higher flows creating localised flooding.

There are also ecological concerns with willows displacing native vegetation, reducing fish habitat and water quality. This is all due to its ability to take over a stream, changing watercourses, flow and eroding out stream banks.

When writing the first version of this plan it was thought that the seeds (Black willows' main source of dispersal) remained viable for only 2 weeks. This was the reason behind a 10 year plan of eradication. We are still aiming for eradication but the questionable longevity of the seed has altered the time frame. Due to the amount of seedlings appearing over the last few years, on the ground operators are now thinking it is more likely that seeds are remaining viable for years rather than weeks... Therefore until we know a bit more about the seed viability it is hard to settle on a 5 year eradication plan.

Black willows range is currently restricted, as it is frost sensitive and therefore doesn't usually grow above 900m in altitude. Also depending on environmental conditions, Black willows generally don't start seeding / developing catkins until at least 5 years of age. It would have to be growing in a very favourable environment to seed any earlier, thus allowing time to locate and eradicate all offspring.

Infestations within the Murrumbidgee catchment at present, all occur within a 150km radius of Tumut (Appendix 1). Tumut Shire is where the major seed source was planted, resulting in the majority of Black willow infestation being located in this shire mainly along the Adelong creek, Bombowlee Creek, Goobarragandra River, Gilmore creek as well as along the foreshores of Blowering Dam. Tumut Shire has already removed all known core infestations on council lands and private property. Monitoring and treatment of new germinations will be ongoing. Gundagai Shire, having located a number of mature trees along the Murrumbidgee River and Oak Creek, is currently in the process of treating these. Wagga Wagga City Council has surveyed watercourses which resulted in finding Black willow trees and seedlings along Tarcutta and Umbango creeks. A single tree found at Borambola was treated as soon as it was positively identified as Black willow. Black willow was also planted in the Tumbarumba Shire, these were treated three years ago and follow-up work is conducted annually. Follow-up work involves checking previous year's work, treating new sightings and removing new seedlings. Tumbarumba shire has a high success rate with this process and all trees treated are marked and recorded. The only known major infestation in the area is on the western Blowering foreshores.

Infestations within Kosciuszko NP are primarily associated with the eastern Blowering foreshores, Yarrangobilly River, Jounama Creek and Goobarragandra River. All sites have been treated and monitoring and follow-up is occurring. Issues remain with infestations below the high water line of Blowering Dam.

Several successful Black willow field days have already been held in the region involving Landcare, landholders and members of the former Black Willow Working Group (BWWG). An information brochure - *What is the Problem with Black Willow?* has also been produced by the Black Willow Working Group, being jointly sponsored by Tumut Landcare and DLWC. Tumut Landcare also distributes a quarterly newsletter.

The National Willow Taskforce recently ran a willow workshop in Tumut for all organisations to gather mapping data; update the group on the Willow sawfly; familiarise participants with basic willow identification skills both theory and practical; and discuss willow management techniques being used in the area. The National Willows Program Resource Kit is an excellent tool that will be beneficial and is recommended for all willow managers across the Riverina.

3.2 The "Do Nothing" Option

With Black willows capability to spread such great distances via wind, it is vital to eradicate the major seed source and **all** viable offspring before it disperses any further. If we don't identify and eradicate all trees within the catchment this species will continue to spread at an exponential rate. Complete eradication needs to be a joint venture – **all** trees removed, as this species occasionally produces flowers of both sexes, and thus seeds that could produce new trees.

The level of infestation is still within the scope of total eradication in this catchment, but if left untouched, Black willow has the potential to infest and dominate all streams in the Region, having already been located in the Murrumbidgee river as far west as Wagga Wagga. The Murrumbidgee River is under serious threat because it has numerous sandy beaches and floodplains that are ideal for Black willows' seed germination.

A coordinated control program in the Upper Murrumbidgee has virtually eradicated Black willow from that region, showing that what we are aiming to accomplish is achievable. This was achieved with the development of the Willow Management Strategy for the Upper Murrumbidgee Catchment, produced by Willows Working Group of the ACT Environment Advisory Committee and The Willows Working Group of the Upper Murrumbidgee Catchment Coordinating Committee. ACT Parks and Conservation Service also played a key role with the eradication of this species.

Private landholders have been overwhelmingly supportive of Landcare activities specific to Black willow; two field days were conducted in the Tumut / Adelong region with 60 and 30 people in attendance. Another Black willow field day was held in the Wagga Shire run by DoL and Landcare, with many landholders in attendance.

The Riverina Highland Weeds Working Group (formerly Black Willow Working Group - BWWG) and Riverina Highlands Landcare Network - have been formed and will ensure the goal of "eradicating Black willow in the Riverina region" is achieved.

Further information on the potential distribution of black willow will be available from the National Willow Taskforce once risk assessments have been undertaken.

3.3 Distribution of Infestations

Refer to Appendix 1 for distribution in the Murrumbidgee catchment. We are in the process of updating the distribution map through the information obtained at the workshop the National Willow Taskforce ran recently in Tumut.

3.4 Weed Biology

Black willow usually has a single prominent stem; if grazed heavily when younger it may be multi-stemmed. The crown is conical when young, broad when old, up to 20m in height. Its bark is usually deeply fissured and branches slender but not drooping, shiny red-brown, fragile at base. The leaves are thin, equally bright green on both side, usually hairless and have quite obvious teeth or serrations on the margins. Flowers, Catkins 6-12cm long with widely spaced 6mm long flowers supported by 2-3mm long, deciduous scales; 4-7 stamens per flower; ovary on 2mm long stalk.

Young seedlings are easily identified by their dark purple, reddish-brown, almost black stem. Mature trees produce seed most years and grow in creeks as well as roadside ditches.

Salix nigra is not showing itself to readily hybridise with other species in the Riverina region as it flowers too late; the only exception being very late flowering hybrids that it might interact with.

3.5 Method and Rate of Spread

Seed dispersal is Black willows main mechanism of spread. Its tiny seeds can float on the slightest breeze, having been recorded dispersing up to 50-100km by these means. Transport of seed by water can result in small numbers of willows establishing. Seed from Black willow are viable for about two weeks; thus it doesn't have long to find suitable bare and wet soils (germination grounds). With the seed having such a short lifespan its long-term eradication is believed to be possible. Having said this, recent observations by field staff have found that seed may be viable for years rather than only 2 weeks!

Black willow is also capable of spreading vegetatively; fragments that break off have the capability of rooting to form new trees.

3.6 Species Management

Control of Black willow is either conducted via stem injection of herbicide, with later removal of the dead tree (when necessary), or by felling trees and treating the stumps. Care needs to be taken that live branches don't fall into the stream, as they will take root downstream. This needs to be done for **each individual** tree. After the removal of the willows it is generally necessary to plant native vegetation, long stemmed / tube stock, to assist with bank stabilisation. Black willow seedlings can be easily pulled by hand, appropriate disposal is essential. All treated areas need to be re-inspected annually to ensure that the previous year's control was successful. Potential sites should also be inspected regularly. If seedlings are discovered and the source can not be located, a helicopter survey may be necessary to find, eradicate and thus prevent any further seedlings. Mature trees can be controlled all year round, with seedlings only able to be sprayed during spring/ summer when they have foliage.

Refer to the following literature:

* Information Brochure by Tumut Black Willow Working Group. *What is the Problem with Black Willow?* Jointly sponsored by Tumut Landcare and DLWC.
* *Noxious and Environmental Weeds Control handbook 2004-2005: A guide to weed control in non-crop, aquatic & bushland situations. Revised ed Agdex 647. Ensbey, R. RWCC NSW DPI.*
* *Willow control. By Bob Trounce and Kurt Kremer. Publ. By NSW Agriculture. 6pp (1997).*
* *Yaven-Nacki-Hillas Landcare Group - Adelong Creek Rehabilitation Project Consultant Report.* River and Rural Management Services, Leon Miners. (2001).
* *National Willows Program* – Resource Kit (2006)

NOTE: When referring to the above literature, chemical users must read the label.

3.7 Key Land Managers

All land holders/managers listed below are critical in the success or failure of this plan, being active members of the RHWWG. If one tree were to be left standing due to a landholder not wanting to remove it, we will not win the war against Black willow, as they are prolific seeders. Black willow is declared a Class 3 weed in 8 councils; this will ensure all remaining trees are removed.

Department of Environment and Conservation, State Water, Forests NSW – NSW DPI, North East CMA, Roads and Traffic Authority, Department of Lands, Rural Lands Protection Board's, Local Control Authority's, Land holders / Land managers.

4.0 LEGISLATIVE and REGULATORY SITUATION

4.1 Current Declaration

Black willow is a Class 3 noxious weed in the following Local Government areas: Albury City Council, Greater Hume Shire Council, Gundagai Shire Council, Junee Shire Council, Narrandera Shire Council, Tumbarumba Shire Council, Tumut Shire Council and Wagga Wagga City Council.

Class 3: The plant must be fully and continuously suppressed and destroyed.

Willows (all species except *Salix babylonica, S. x reichardtii, S. x calodendron*) are a Class 5 Noxious Weed throughout NSW.

Class 5: Plant may not be sold, propagated or knowingly distributed.

5.0 CONSIDERATIONS and OPPORTUNITIES

5.1 Financial support to carry out the plan

This plan will adopt a coordinated approach to the management of Black willow utilising the expertise and knowledge of stakeholders. Individual tree control / removal is not adequate, a coordinated approach is required involving the entire catchment. This is one of the main reasons that the Black Willow Working Group (BWWG) was established in 2000 – so Black willow eradication was carried out comprehensively (see appendix 2 for original BWWG members and associates list). Outside funding opportunities are always arising and below are three opportunities that have and will go towards achieving the aim of this plan, as well as the BWWGs 10-year end target of total eradication.

In April of 2001, Tumut-Adelong Region Catchment Management Group (TARCMG) put together a submission for funding from the Weeds of National Significance, the vision of the project being "To stop the spread of Black Willow from destroying our regions waterways and wetlands". It was stated in this project (that was asking for a NHT grant of $238,300 with community contributions of $348,700), that if the Black Willow problem is not addressed in the next 5 years the exponential spread will be impossible to contain. The amount of inkind contribution shows the support the community has towards the eradication of this noxious weed.

A pilot Black willow eradication project has already been conducted with $10,000 worth of funding obtained by application to the Bidgee Banks Program, as well as an additional $3,000 contributed by Tumut Shire Council. The funds paid for contractors to conduct a trial that was to assess the best approach to willow management in the Riverina region. This would then be seen as a benchmark for future projects in the region. The core infestation has now been removed from this creek; time will now be spent going from the top of the infestation and working down-stream eradicating marginal and rare/isolated trees and seedlings. It is estimated that $10,000 will only cover a quarter of the cost to control Black willow along Adelong Creek. Significant funding support for contractor control of Black willow in high infestation areas is essential in achieving the 10-year target.

A helicopter survey was also conducted mid this year. This was funded jointly by Bidgee Banks, Wee Jasper Landcare Group and State Forests, to locate Black willow that weren't visible from the ground. This was found to be a success as 15 very large mature *S. nigra* that were not visible from roads were sighted in amongst pine trees. Wee Jasper Landcare Group along with National Parks have used the map produced from this survey to treat all sightings.

Infestations within Kosciuszko NP are primarily associated with the eastern Blowering foreshores, Yarrangobilly River, Jounama Creek and Goobarragandra River. Treatment is estimated at $5,000 with contract and staff costs.

5.2 Links to other Strategies

- The Australian Weeds Strategy (draft).
- The New South Wales Weeds Strategy soon to be replaced by the NSW Invasive Species Plan.
- National Willow Strategic Plan – Weeds Of National Significance.
- Willow Management Strategy for the Upper Murrumbidgee Catchment.
- Murrumbidgee and Murray CMA Catchment Action Plans.
- North East Catchment Management Authority Willow Management Strategy
- Draft Regional Weed Strategies for Murrumbidgee and Murray Catchments.

5.5 Barriers and Contingencies

The following barriers will delay or obstruct the operation of this Black willow regional plan:

- Legislation – River protection – removal of trees from river banks and within streams
- Legislation – pollution prevention – it is an offence to allow herbicides to enter any waterway.
- Lack of resources / equipment
- Community attitudes and lack of awareness of problems this species can cause
- Lack of knowledge on control options
- Reduced incomes
- Climatic conditions
- Landholders refusal to control Black willow after the declaration change
- Land ownership – Blowering dam foreshore – who owns and manages what.
- Herbicide use on or near water
- Removal of vegetation in riparian areas – permits required?
- Accessibility
- Biology (seed bank)

The following contingencies may delay or obstruct the operation of this Black willow regional plan:

- Flood during peak seeding – through infested creeks or rivers spreading seed further downstream to uninfested areas.
- Hidden seeding parent trees
- Untimely wind – spreading seed up to 100km from seeding parent trees
- Coordination between land tenures and land manager reluctance to control.

6.0 PERFORMANCE INDICATORS AND ACTIONS

Objective a: Ongoing monitoring of eradicated BW from Gocup/Tumut plantations.		
ACTIONS	**PERFORMANCE INDICATORS**	**RESPONSIBILITY**
1 Remove final 12 Black willow trees by December 2007	1. 12 remaining Black willow trees removed by Dec 2007	1. Tafe NSW chainsaw classes
2 Inspect sites annually for regrowth.	2. Sites inspected annually.	2. LCA's.
3 Follow-up work – removing any new growth.	3. New growth removed, properties remain clean.	3. LCA's & Landholders.
Objective b: Ongoing monitoring and treatment of all new germinations of all treated heavy seed bearing (core) Black willow infestations, Oak Creek, Adelong Creek, Blowering Dam (western foreshore), Bombowlee Creek, Goobarragandra River and Gilmore Creek; starting at the top of the Murrumbidgee catchment and working down, by the end of the plan period.		
ACTIONS	**PERFORMANCE INDICATORS**	**RESPONSIBILITY**
1. Undertake specific surveys for potential BW sites – previously found there or downstream.	1. BW surveys completed annually.	1. LCA's, Forests NSW, DEC, State water.
2. Treat and remove **all** BW trees, rehabilitating the river bank where required with long-stemmed tube stock to prevent further riverbank erosion and BW reinfestation.	2. All BW trees destroyed and replacement vegetation establishing on riverbanks.	2. LCA's, Forests NSW, DEC, State Water, Landholders and Landcare.
3. Monitor regeneration in area and conduct follow up treatment – inspect previously infested areas and remove any new growth.	3. New infestations removed. Properties kept clean.	3. as above.
Objective c: Remove all scattered (marginal) Black willow infestations, Tarcutta Creek, Umbango Creek and Murrumbidgee River at Gundagai; starting at the top of the Murrumbidgee catchment and working down, by the end of the plan period.		
ACTIONS	**PERFORMANCE INDICATORS**	**RESPONSIBILITY**
1. Undertake specific surveys for potential BW sites – previously found there or downstream of locations.	1. BW surveys completed annually.	1. LCA's, Forests NSW, Dec, State water, RLPBs.
2. Treat and remove **all** BW trees rehabilitating the river bank where required with long-stemmed tube stock to prevent further riverbank erosion and BW reinfestation.	2. All BW trees destroyed and replacement vegetation establishing on riverbanks.	2. LCA's, Landholder and Landcare.

3. Monitor regeneration in area and conduct follow up treatment – inspect previously infested areas and remove any new growth.	3. New infestations removed. Properties kept clean.	3. LCA's & Land managers (LM).
Objective d: Locate rare and isolated and identify new Black willow (BW) infestations (seedlings) to be treated within 1st year of discovery.		
ACTIONS	**PERFORMANCE INDICATORS**	**RESPONSIBILITY**
1. Inspect for BW as part of routine property inspection programs.	1. Property inspection programs implemented.	1. LCA's.
2. Undertake specific surveys for potential BW sites – previously found there or downstream of locations. Ref: National Willow Strategy Goal 2.2.1	2. BW surveys completed annually.	2. All stakeholders.
3. All field staff and landholders to report and map any new sightings of BW.	3. Map developed and regularly being updated.	3. LCA's, landholders.
4. Control all new infestations, adopting appropriate control practices.	4. Infestations controlled within year of detection.	4. All stakeholders.
5. Locate seeding parent plant and remove.	5. Seeding parent plant removed.	5. LCA's landholders.
6. Ensure land managers (LM) adopt appropriate practices, contacting LCA's.	6. Extension programs in place to increase awareness.	6. LCA's.
Objective e: All land managers, including government agencies, and the general public given further opportunity to attain identification skills and an understanding of the potential problems Black willow (BW) can cause while learning the appropriate management practices for its eradication.		
ACTIONS	**PERFORMANCE INDICATORS**	**RESPONSIBILITY**
1. Run extension program targeted at relevant land managers, industries and the public; based on outlining the problems this weed can cause and its recognition.	1. - 4 workshops/ field days run within the region over plan period. - Relevant LCA/ RLPB staff attend at least 3 regional field days (eg, Henty) / year. - 4 media releases run over plan period. - Personal contact made with each LM during inspections where possible.	1. LCA's, RLPBs, RHWWG, E/WRNWAG.

2. Nursery surveys conducted annually to ensure BW isn't being sold, propagated or distributed. Ref: National Willow Strategy Goal 1.1.4	2. Nurseries free of BW.	2. LCA's.
3. Maintain links with National Willow Taskforce (NWT), through email & phone link ups.	3. Remain on National Willow Taskforce email list and distribute relevant information to RHWWG	3. RHWWG, RNWPO
4. Forward correspondence from NWT on to relevant organisations & provide the NWT with local knowledge on willow distribution.	4. Relevant organisations kept current with NWT correspondence and NWT kept current with local knowledge and distribution.	4. RHWWG, RNWPO

7.0 MONITOR AND REVIEW PROCESS

The Riverina Highland Weeds Working Group will review the progress of the five year plan during their quarterly meetings. The previous years activities will be reviewed and participants will check they are on track to meet this plans overall aim / objectives / actions. All stakeholders will go over planned activities for upcoming season, arrange resource sharing and familiarise each other as to what activities are to be conducted (especially adjoining LCA's). Where appropriate renew plan commitment and discuss Regional Group Project Funding Application for this weed so that it can be developed in time for the May deadline.

The Regional Project Officer will collate the annual Group Project Report as at June 30th for the Noxious Weeds Advisory Committee by the end of September. The preparation of this report will require all participating LCA's & RLPBs receiving funding for this weed to submit a completed questionnaire and signed financial statement, outlining funds expenditure, to the project officer for audit purposes.

8.0 BENEFITS

This plans overall aim is to eradicate Black willow from the Riverina region. The benefits include:

- Cooperative approach to Black willow management throughout the Murray and Murrumbidgee Catchments.
- Prevention of potential control costs for future land managers.
- Primary industries such as agriculture, horticulture and landholders in general. As Black willow infestations are eradicated more watercourses should be freed up enabling greater land use for increases in production, creating better water access for stock etc. With midstream Black willow being removed, bank erosion will reduce and thus stream widening will gradually decline. Landholders will not be losing their land into streams. Minimising the spread of this weed should also protect these industries in other parts of the region, state and country, currently unaffected by infestations, from the negative effects of this weed.
- The general environment and recreational areas where infestations can restrict the movement of people or animal species or inhibit regeneration of native species.
- The local economy through flow on effects of enhanced productivity of industries previously affected by Black willow.
- Other catchments that may choose to use this plan as a base model for their own management plan for Black willow or other invasive willow species.
- Ecosystem integrity.

It also aims to improve networks between stakeholders. These benefits will accrue as a result of this plan bringing together people with an interest in the problems caused by Black willows, an interest which provides a commonality of purpose across the region for its control. The impacts of willows are summarised under section 1.3 in the WONS Willow Strategic Plan.

The cost savings through preventing Black willow from establishing will be significant, although at this stage it is difficult to make a precise estimation. The NWT is carrying out a weed risk assessment project that should give us a better indication.

Due to Black willows capability to spread such great distances it is a large area that will benefit from the eradication of this weed.

9.0 RESOURCES

- References and Further Readings

Ensbey, R. (2004/5). Noxious and Environmental Weed Control Handbook 2001/2002 – A guide to weed control in non-crop, aquatic and bushland situations. Revised ed, Agdex 647, NSW Ag. Original by Hugh Milvain (1999).

Murray, Murrumbidgee, Lower Murray Darling CMA Catchment Action Plans

National Willows Program – Resource Kit (2006), Department of Primary Industries, Victoria.

Australian Weeds Strategy (draft).

NSW Weeds Strategy soon to be replaced by the NSW Invasive Species Action Plan.

Willow Management Strategy for the Upper Murrumbidgee Catchment (June 1998). Produced in collaboration by: Willows Working Group of the ACT Environment Advisory Committee, and Willows Working Group of The Upper Murrumbidgee Catchment Coordinating Committee.

Agriculture & Resource Management Council of Australia & New Zealand, Australian & New Zealand Environment & Conservation Council and Forestry Ministers, (2000) *Weeds of National Significance Willow Strategic Plan.* National Weeds Strategy Executive Committee, Launceston.

The Western & Eastern Riverina Noxious Weeds Advisory Groups, Noxious Weeds Guide Brochures.

Cremer, K.W. 1995, (revised 1996) *Willow identification for river management in Australia*, CSIRO Division of Forestry, Technical Paper no 3, 22pp.

Cremer, Kurt (1999) *Willow management for Australian rivers.* Natural resource Management, Special Issue, Dec. 1999, pp 1-22.

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Trounce, Bob and Cremer, Kurt (1997), *Willow Control*, Publ. By NSW Agriculture. 6pp.

Yaven-Nacki-Hillas Landcare Group – *Adelong Creek Rehabilitation Project Consultant Report.* River and Rural Management Services, Leon Miners (2001).

NECMA 'Willow Management Strategy for the NECMA', adopted 12/12/2003.

ACKNOWLEDGEMENTS

The authors wish to thank the stakeholders who assisted with the production of this document. Their contributions have enriched this regional weed management plan.

DISCLAIMER

Any recommendations / comments contained in this document or referred literature do not necessarily represent the plan proponents, participants / stakeholders, authors, coordinators or NSW DPI policies or specific views. No person or organisation should act on the basis of the contents of this document or referred literature, whether as to matters of fact or opinion or other content, without first obtaining specific, independent professional advice which confirms the information contained in this document or referred literature.

APPENDIX 2.

Original BLACK WILLOW WORKING GROUP.
Committee members and Associates

Bob Thurling	Wagga Wagga City Council
Rick Hargreaves	Tumut Landcare Coordinator
David Priem	Tumut Department of Land and Water Conservation
Simon Allender	National Parks and Wildlife Service
Matthew Pope	State Forests NSW
Russell Percival	Gundagai Shire Council
Brent Livermore	Tumbarumba Shire Council
Lance Webb	Landcare member and farmer
Brett Upjohn	NSW Agriculture
Ian Robson	Landcare member and farmer
Craig Molineaux	Landcare member and farmer
Simon Lang	Willow Management Consultant
Peter Ellison	Tumut Shire Council
Rob Owers	Tumut Shire Council
Stuart Pengelly	Department of Land and Water Conservation
Sue Robb	Yarrowlumla Shire Council
Philip Hansen	Queanbeyan Shire Council
Mark Gardiner	Wagga Wagga City Council
Neil Hibberson	Holbrook Shire Council
Paula Ash	Riverina Noxious Weeds Project Officer
Birgitte Verbeek	Regional Weed Control Coordinator – NSW Agriculture
Kurt Cremer	CSIRO Canberra