

# Section 6

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## Contacts

Region	Telephone number	Website
<b>National</b>	For current contact details visit website	<a href="http://www.weeds.org.au/WoNS/Willows/">www.weeds.org.au/WoNS/Willows/</a>
<b>Australian Capital Territory</b> Parks, Conservation and Lands	13 22 81	<a href="http://www.tams.act.gov.au/live/environment">www.tams.act.gov.au/live/environment</a>
<b>New South Wales</b> Department of Primary Industries	(02) 6391 3100	<a href="http://www.dpi.nsw.gov.au/">www.dpi.nsw.gov.au/</a>
<b>Queensland</b> Department of Primary Industries and Fisheries, incorporating Biosecurity Queensland	13 25 23	<a href="http://www.nrw.qld.gov.au/">www.nrw.qld.gov.au/</a>
<b>South Australia</b> Department of Water, Land and Biodiversity Conservation	(08) 8303 9620	<a href="http://www.dwlbc.sa.gov.au/">www.dwlbc.sa.gov.au/</a>
<b>Tasmania</b> Department of Primary Industries and Water	1300 368 550	<a href="http://www.dpiw.tas.gov.au/">www.dpiw.tas.gov.au/</a>
<b>Victoria</b> Department of Primary Industries	13 61 86	<a href="http://www.dpi.vic.gov.au/">www.dpi.vic.gov.au/</a>

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## Glossary

Term	Definition
ASTER	A high resolution imaging instrument flying on the satellite Terra. <u>A</u> dvanced <u>S</u> paceborne <u>T</u> hermal <u>E</u> mission and <u>R</u> eflection <u>R</u> adiometer.
Catkin	A stalk with many tiny, petalless flowers that are usually either all male or all female (although some willows can have male and female flowers on the same catkin). Catkins can be found on willows, birches, oaks, poplars and certain other trees.
Cultivar	A variety of a plant that has been created or selected intentionally and maintained through cultivation. For example, <i>Salix matsudana</i> ‘Tortuosa’ (tortured willow) is a cultivar created by the nursery trade from the species <i>Salix matsudana</i> .
Genus	A unit of taxonomic classification above the level of a species. All willows are in the genus <i>Salix</i> . The genus name is written as the first part of a scientific name. For example, <i>Salix fragilis</i> refers to the genus <i>Salix</i> and species <i>fragilis</i> . The genus can be shortened to the first letter, such as <i>S. fragilis</i> , so long as it is clear that this refers to genus <i>Salix</i> .
Hybrid	A cross bred plant or animal. Hybrids may be formed as a result of a male of one species pollinating a female of another. The hybrid has a mix of genetic material from both parents. For example, <i>S. alba</i> can hybridise with <i>S. fragilis</i> . The hybrid that results may be identified by its parents ( <i>S. alba</i> x <i>S. fragilis</i> ) or its own name ( <i>S. x rubens</i> ), where x indicates that it is a hybrid.
Species	A unit of taxonomic classification below the level of genus. The species name is the second part of a scientific name. For example, <i>Salix fragilis</i> refers to the genus <i>Salix</i> and the species <i>fragilis</i> .
SPOT5	Satellite images taken around the world with a SPOT5 satellite sensor.
Subgenus	Sub-category of a genus above the level of species. Individuals within a subgenus usually have certain characteristics that distinguish them from other members of the same genus. For example, the genus <i>Salix</i> has three subgenera: <i>Salix</i> (‘tree willows’), <i>Vetrix</i> (‘shrub willows’) and <i>Chamaetia</i> (‘alpine or dwarf willows’). These three subgenera can be easily distinguished from each other by certain characteristics.
Subspecies (ssp)	A sub-division of a species of organisms, usually based on geographic distribution. The subspecies name is written in lowercase italics following the species name. For example, <i>Salix cinerea</i> spp. <i>cinerea</i> and <i>Salix cinerea</i> spp. <i>oleifolia</i> are two subspecies of the species <i>Salix cinerea</i> .
Sucker	A shoot arising from roots or underground stems.
Taxa	The members of a particular taxonomic group, such as a genus, subspecies or species. For example, all willows are in the genus <i>Salix</i> , so willow taxa will include all subcategories (species, sub species, hybrids, varieties or cultivars) of the genus <i>Salix</i> .
Variety (var.)	A taxonomic subdivision of a species consisting of naturally occurring or selectively bred populations or individuals that differ from the remainder of the species in certain minor characteristics. For example, <i>Salix alba</i> var. <i>vitellina</i> (golden willow) and <i>Salix alba</i> var. <i>alba</i> (white willow) are two varieties of the species <i>Salix alba</i> .

## Acronyms

<b>Term</b>	<b>Definition</b>
APVMA	Australian Pesticides and Veterinary Medicines Authority
CMA	Catchment Management Authority
NRM	Natural Resource Management
TAFE	Technical and Further Education
WoNS	Weed of National Significance

## Appendix 1: Examples of risks involved in willow management

Risks	Description of risk
<b>Damage to downstream infrastructure</b>	After willow control, there is a risk that debris can be moved downstream, where it can become a hazard to bridges, other infrastructure and boating.
<b>Worker safety</b>	Willow removal is dangerous, particularly where heavy machinery and chainsaws are involved.  Works are often conducted in riparian environments where footing can be unstable and access limited.  If willows are left standing after poisoning, there is a risk to worker safety from falling limbs and blockages to the river during follow-up maintenance.
<b>Public safety</b>	When leaving willows standing after poisoning by stem injection method, there is a risk to public safety from falling limbs.
<b>Bank instability following willow removal</b>	Willow removal can leave some riverbanks devoid of vegetation, which can temporarily lead to bank instability.
<b>Impacts on remnant native vegetation</b>	Using machinery can cause significant damage to native vegetation. Once willows are controlled, these plants will be important in helping control erosion and in recolonising areas where willows have been removed.
<b>Reinvasion from willow regrowth or other weeds</b>	Removing willows creates cleared areas that are prone to reinvasion by willows or invasion by other weeds (for example, blackberry or aquatic weeds).  This may threaten significant environmental assets, such as areas of remnant native vegetation or habitats for rare/endangered aquatic or riparian fauna.
<b>Reduced water quality from catchment inputs</b>	There are many potential sources of input from the catchment that could impact on water quality in the river, such as high sediment and attached nutrient loss from hill slopes or contaminants carried in storm water runoff.  Where dense willow infestations exist, there is often little to no ground cover under the willows to absorb excess nutrients and other runoff prior to it reaching the river.



(Melbourne Water)



(Danny Henderson, Southern Rivers CMA)



(Willow Warriors Inc.)

## Suggestions to reduce risk

Dispose of debris as soon as possible by removing it from the site, piling and burning.

Construct debris piles above flood line where possible.

Good training of personnel.

Have well-established safe working procedures.

Use well-maintained equipment.

Do not use this method in a public area.

Fell willows before they die and become unstable.

Put up signs to alert the public that works are being/have been undertaken.

Practice staged removal or use of appropriate engineering solutions.

In some situations, it may be advisable to leave individual trees if they are playing a vital role in bank stability.

Use waterway experts to provide advice.

Does machinery need to be used on site? If so, minimise impacts of machinery by carefully identifying access points and sites for piling and burning waste material and choose machinery that has least impact on the banks (for example, some excavators can carry, rather than drag, willow material, which reduces pressure on the banks).

Control other weeds before, during and after willow removal.

Prior to control, look outside your site and manage any weeds that will likely invade your site following willow removal.

Ensure willows are 100% killed by using correct herbicide application techniques, to prevent regrowth.

Conduct thorough site clean ups and follow-up control.

Revegetate the area as quickly as possible.

Establish a quick-growing ground cover to filter nutrient and storm water runoff before it reaches the waterway.

Determine and manage for any potential threats to water quality from land use in the surrounding catchment.



## Appendix 2:

# Checklist of things to consider when determining an appropriate control technique

		Project site assessment		
		Tick which boxes are applicable to your site then look along the rows to determine which control methods (highlighted in green) best match your situation		
		✓		
Assessment Factors	Willow target	Size	More than 150 mm stem diameter	
			Less than 150 mm diameter, more than 2 m in height	
			Small plants, less than 2 m in height	
		Type	Tree (subgenus <i>Salix</i> )	
			Shrub (subgenus <i>Vetrix</i> )	
		Density	Occasional or scattered willows	
			Scattered stands with isolated trees interspersed	
			Large dense infestation	
		Location	Bank	
			Instream	
		Form	Horizontal stems that need treating	
			Vertical stems that need treating	
	Potential environmental impacts on site	Machinery access to site	Easy to bring machinery on site	
			Difficult to bring machinery on site	
		Machinery access to willows without causing damage to banks	Easy for machinery to access willows without causing damage to banks	
			Difficult for machinery to access willows without causing damage to banks	
			Wet ground: Machinery tracks could cause significant damage to the site	
			Dry ground: Machinery tracks unlikely to cause significant damage to the site	
		Existing vegetation within willows (effect of falling limbs on vegetation)	Mostly native vegetation in good or excellent condition	
			Mostly weeds, grass or native vegetation in poor condition	
		Existing vegetation adjacent to willows (track issues caused by machinery)	Mostly native vegetation in good or excellent condition	
			Mostly weeds, grass or native vegetation in poor condition	
		Waste management	Area available for stockpiling willow material (either on or off-site)	
			No areas appropriate for stockpiling willow material	
	No fire restrictions prohibit stockpiling			
	Fire restrictions prohibit stockpiling			
	Potential social impacts	Public access	Public land or high recreational use along waterway (risk to people)	
			Private land (negotiate outcome with landholder/community)	
Conditions downstream of site (distance to consider will depend on how far willows are likely to travel – for example, will travel less distance along wide flood plain than along fast flowing gorge)	Infestation class (refer to Willows Resource Kit: Resource sheet 5)	Infrastructure considered at high risk from willow movement downstream		
		Active floodplain considered at high risk from willow movement downstream		
		Infestation classes: 1, 3, 5, 7, 8		
		Infestation classes: 2, 4, 6		
		Rank the available options for your site in order of preference / closest match to above assessment		





# Willows Management Guide

