

National weed risk assessment of willows in Australia

List of willow taxa to be assessed

At least 32 naturalised and 47 cultivated willow species, varieties and hybrids are present in Australia and the distribution, invasiveness and impacts of these different willows are still poorly understood. It is unrealistic and unnecessary to expect that all willows can and should be controlled. Control programs therefore need to target priority species (those that currently or have the potential to impact on high social, environmental or agricultural values) or priority areas.

The National Willows Taskforce has commenced a national weed risk assessment (WRA) of all willows in Australia in order to objectively prioritise willow species, groupings and locations for coordinated control programs at the regional, State/territory and national levels. This process utilises published literature and expert opinion on the biology, ecology, current distribution and potential distribution of each willow. The three major assessment components are:

1. the plant's invasiveness,
2. its current and potential distribution, and
3. impacts of the plant on land use and ecosystems.

Given that there are over 300 willow taxa world wide, with a complex variety of species, subspecies, varieties, hybrids and cultivars, it is not feasible to assess the weed risk of all willow taxa individually. We have therefore adopted an objective process to determine which species or groupings of willows will be assessed.

Assessments will be made of the following willows (*Salix*) that are present in Australia; either naturalised or in cultivation:

1. Each of the three *Salix* subgenera: *Salix*, *Vetrix* & *Chamaetia* (according to the taxonomy of Skvortsov, 1999).

Species within a subgenus and the hybrids that form between them (within that subgenus) often share many biological and ecological traits. An assessment of each subgenus can use high quality data to give a broad picture of the invasiveness of whole groups of willows. This enables us to make predictions about the invasiveness of those willows that we have very little information about. It will also assist land managers to make decisions about willow management where there is uncertainty about the identification of the willows in the field. It is easier to identify the subgenus that a willow belongs to, than to work out exactly which species or hybrid the plant is.

2. All naturalised species and named hybrids

Willows have naturalised in Australia, both as recognised species and as hybrids between those species. To confidently assess these willows it is important that the data used can be attributed to a particular type of willow. Most willows will be assessed at the species level with notes about the subspecies, varieties etc. if they differ significantly from each other.

It is difficult enough to identify individual willow *species* and even harder with *hybrids*. We will assess only hybrid willows that have been named according to the *Code of Botanical Nomenclature* (see Lumley & Spencer (1991) for further explanation) as literature describing these "named" hybrids is more likely to be consistently referring to the same plant. Hybrids that have been named according to the *Code* can be identified in the literature, because they are written with a cross between the genus and the species, eg. *Salix x reichardtii*.

3. Willows not naturalised in Australia that have become naturalised far beyond their native range, especially those that are naturalising in New Zealand and Oceania, where *Salix* is absent from the native flora (Skvortsov, 1999).

One of the best indicators that a plant will naturalise in Australia is its ability to naturalise elsewhere in the world.

4. Willows not naturalised in Australia that exhibit invasive traits such as forming dense thickets

If these willows were to naturalise in Australia, they may have the potential for major adverse impacts on environmental, agricultural and social values in Australia. A weed risk assessment can determine whether a particular willow poses a low or high weed risk.

5. Willows not naturalised in Australia and suspected of having a low weed risk.

Willows have social and economic value as cultivated plants. It would be useful to know which ones might be suitable for cultivation from a risk management perspective. These might include single-sex sterile clones with flexible (not brittle) stems. We particularly require input from the nursery and garden industry on which plants we should assess in this category.

6. Willows exempt from noxious weed legislation

Salix babylonica, *Salix X calodendron*, and *Salix X reichardtii* (exempt everywhere in Australia); and *Salix caprea* 'Pendula', *Salix alba x matsudana*, *Salix matsudana* 'Aurea', *Salix matsudana* 'Tortuosa', *Salix myrsinifolia* and *Salix alba* var. *caerulea* (exempt in Victoria) (Faithfull, 2006). Although these willows are not covered by noxious weed legislation in every state, some have naturalised and some have the potential to naturalise, so it will be useful to know how they compare to other willows from a weed risk perspective.

Table: Proposed list of willow taxa for assessment

Willow	Notes	Reason for assessment
<i>S. subg. Chamaetia</i>		1. Subgenus
<i>S. subg. Salix</i>		1. Subgenus
<i>S. subg. Vetricis</i>		1. Subgenus
<i>S. aegyptiaca</i>	Syn. <i>S. medemii</i> (Cremer, 2003)	2. Naturalised (ARMCANZ)
<i>S. alba</i>	Incl. vars. <i>alba</i> , <i>sericea</i> & <i>vitellina</i>	2. Naturalised (ARMCANZ)
<i>S. alba</i> var. <i>caerulea</i>	Cricket bat willow	6. Exempt in Vic (Faithfull, 2006)
<i>S. alba x matsudana</i>	New Zealand hybrid	2. Naturalised
<i>S. babylonica</i>		2. Naturalised (APNI)
<i>S. caprea</i>		6. 'Pendulina' exempt in Vic (Faithfull, 2006)
<i>S. cinerea</i>	Incl. ssp. <i>oleofolia</i> & <i>cinerea</i>	2. Naturalised (APNI)
<i>S. daphnoides</i>		3. Naturalised in NZ (Van Kraayenoord et al, 1995).
<i>S. eleagnos</i>		3. Naturalised in NZ (Van Kraayenoord et al, 1995).
<i>S. eriocephala</i>	Rhizomatous(Stace et al)	3. Introduced & naturalised in England (Stace et al)

Willow	Notes	Reason for assessment
<i>S. exigua</i>	Thicket-forming (unlike others in subgenus <i>Salix</i>) (Newsholme, 1992)	4. Invasive traits
<i>S. fragilis</i>		2. Naturalised (APNI)
<i>S. glauca</i>	Grows fast (Kuzovkina & Quigley, 2004) and forms thickets on subalpine slopes, creeks and rivers (Welsh, 1974).	4. Invasive traits
<i>S. glaucophylloides</i>	This name was misapplied to <i>S. myrcoides</i> (APNI)	2. Naturalised (ARMCANZ)
<i>S. gracistyla</i>	Can spread to form dense thickets (Van Kraayenoord et al, 1995).	4. Invasive traits
<i>S. humboldtiana</i> 'Pyramidalis'	Syn. <i>S. chilensis</i> 'Pyramidalis'	2. Naturalised (APNI)
<i>S. integra</i> 'Hakuro-nishiki'		5. Possibly low weed risk
<i>S. matsudana</i>	Incl. <i>S. matsudana</i> 'Aurea' & <i>S. matsudana</i> 'Tortuosa'	2. Naturalised (ARMCANZ)
<i>S. myrsinifolia</i>	Syn. <i>S. nigricans</i>	6. Exempt in Vic (Faithfull, 2006)
<i>S. nigra</i>		2. Naturalised (APNI)
<i>S. pentandra</i>		3. Naturalised in the US (Argus, 1986);
<i>S. purpurea</i>		2. Naturalised (APNI)
<i>S. triandra</i>		2. Naturalised (APNI)
<i>S. viminalis</i>		2. Naturalised (APNI)
<i>S. x 'Boydii'</i>		5. Possibly low weed risk
<i>S. x calodendron</i>		2. Naturalised (APNI)
<i>S. x mollissima</i>		2. Naturalised (ARMCANZ)
<i>S. x pendulina</i>		2. Naturalised (APNI)
<i>S. x reichardtii</i>		2. Naturalised (APNI)
<i>S. x rubens</i>		2. Naturalised (APNI)
<i>S. x sepulcralis</i>	Incl. vars. <i>sepulcralis</i> & <i>chrysocoma</i>	2. Naturalised (APNI)
<i>S. x sericans</i>		2. Naturalised (APNI)