Impact Assessment Record

Scientific Name: *Salix* x *sepulcralis* Simonk.* Common name: Willows

QUESTION	COMMENTS	RATING	CONFIDENCE
Social			
1. Restrict human access?	***S.* x *sepulcralis*** tend to form single trunks (Carr, 1996), making them less likely to inhibit access by humans as they don't tend to form thickets.	**L**	**MH**
2. Reduce tourism?	***S.* x *chrysocoma*** and *S.* x *sepulcralis* are *S. babylonica* (weeping willow) hybrids (with *S. alba* var. *vitellina*) and so is ***S.* x *pendulina*** (*S. babylonica* x *S. fragilis*) (Meikle, 1984). All resemble the weeping willow (Cremer, 1995), which is valued aesthetically and historically in waterways (ARMCANZ, 2001).	**L**	**MH**
3. Injurious to people?	No reference to human injury found in any reference. Toxicity rated as 'none' for the species summarised in the USDA Plants Database (2006) including *S. purpurea, S. exigua, S. nigra, S.* x *sepulcralis, S. alba.* Presume no toxicity for any *Salix.*	**L**	**MH**
4. Damage to cultural sites?	As semi-aquatic species, confined to stream banks or beds or moist locations (Carr, 1996; Carr et al, 1992; Cody, 1996; Davis, 1982; Howard, 1988; Ladson et al, 1997; Maloney et al, 1999; Munz, 1963; Voss, 1972; Webb, Sykes & Garnock-Jones, 1988) willows are unlikely to grow near enough to cause structural or visual damage to cultural sites. However, during floods, senescent trees can drop large branches or trunks into waterways and a build up of material behind these snags can destroy bridges (ARMCANZ, 2001). Major damage to buildings can occur when streams change route because they have become clogged with mats of willow roots. A Tasmanian Landcare group was formed in response to flooded homes, the cause of which was attributed to stream blockages by willow roots encroaching into streams (Sarah Holland-Clift pers. comm.).	**H**	**MH**
Abiotic			
5. Impact flow?	***S.* x *sepulcralis*** tend to be confined to riverbanks (Carr, 1996), which makes them less likely to impact on flow.	**L**	**MH**
6. Impact water quality?	As deciduous plants (Carr, 1996), all shrub and tree willows have mass autumn leaf fall, which leads to decreased oxygen levels (Ladson et al, 1997). Intense shading by willows, which tend to have more dense canopies than native species decreases water temperature (Ladson et al, 1997).	**H**	**MH**
7. Increase soil erosion?	***S.* x *sepulcralis*** tend to be confined to riverbanks (Carr, 1996), which makes them unlikely to cause erosion, indeed willows were often planted to ameliorate erosion on devegetated banks (Ladson et al, 1997).	**L**	**MH**
8. Reduce biomass?	As woody plants that can form dense thickets, or large shrubs or trees (Carr, 1996), willows are capable of increasing biomass where they replace lower or less dense vegetation as they commonly do in disturbed sites (Cremer, 1999).	**L**	**MH**
9. Change fire regime?	Willows are low flammable/combustible trees (Carcaillet et al, 2001), likely to greatly change the frequency and intensity of fire risk.	**H**	**H**

Impact Assessment Record

Scientific Name: *Salix* x *sepulcralis* Simonk.* Common name: Willows

QUESTION	COMMENTS	RATING	CONFIDENCE
Community Habitat			
10. Impact on composition (a) high value EVC	Basin=East Gippsland- Cann River (ISC=Excellent); CMA=East Gippsland; CLIMATE=VH. For willow species in general, their "dense shade and mat-forming willow roots suppress and kill indigenous understorey" (Purtle et al, 2001b). Capable of displacing some dominant species	**MH**	**MH**
(b) medium value EVC	All Victorian water bodies considered to comprise high value EVCs only (Weiss pers. coms.).	**L**	**H**
(c) low value EVC	All Victorian water bodies considered to comprise high value EVCs only (Weiss pers. coms.).	**L**	**H**
11. Impact on structure?	For willow species in general, their "dense shade and mat-forming willow roots suppress and kill indigenous understorey" (Purtle et al, 2001b).	**MH**	**MH**
12. Effect on threatened flora?	No information found.	**MH**	**L**
Fauna			
13. Effect on threatened fauna?	No information found.	**MH**	**L**
14. Effect on non-threatened fauna?	Intense shading decreases primary production in waterways, impacting on invertebrates and fish (Ladson et al, 1997). Reduce indigenous vegetation which would otherwise provide habitat (especially tree hollows) and pollen and nectar food sources (Ladson, 1997) "Dense shade and mat-forming willow roots suppress and kill indigenous understorey [which is] important habitat for insects, birds and mammals. Bare banks beneath willows provide little protection for frogs, water rats, snakes, lizards and other fauna. Willows do not provide nectar for native birds…Willows also have few hollows, important habitat for over half of our woodland birds and mammals" (Purtle et al, 2001b). Reduction in habitat for fauna, leading to reduction in numbers of individuals but not to local extinction.	**MH**	**MH**
15. Benefits fauna?	The palatability of this species is unknown and, as ***S.* x *sepulcralis*** tend to form single trunks (Carr, 1996), they are unlikely to provide habitat for fauna as they don't tend to form thickets.	**M**	**L**
16. Injurious to fauna?	No reference to animal injury found in any reference.	**L**	**H**
Pest Animal			
17. Food source to pests?	The palatability of other species is unknown.	**M**	**L**

Scientific Name: *Salix* x *sepulcralis* Simonk.* Common name: Willows

QUESTION	COMMENTS	RATING	CONFIDENCE
18. Provides harbor?	As ***S.* x *sepulcralis*** tend to form single trunks (Carr, 1996), they are unlikely to provide harbour for pest species as they don't tend to form thickets.	**L**	**MH**
Agriculture			
19. Impact yield?	Generally willows are valued for shade and browsing for livestock (Besaans, 1995).	**L**	**MH**
20. Impact quality?	Generally willows are valued for shade and browsing for livestock (Besaans, 1995).	**L**	**MH**
21. Affect land value?	"Fibrous willow roots and dense willow foliage trap large amounts of silt which can decrease channel capacity, exacerbate flooding and change flood patterns…Willows encroaching into the centre of streams interrupt the flow of water which results in stream flows being directed into watercourse banks, causing erosion." (Purtle, 2001b). Whilst risk of floods and erosion may cause decrease in land value in some incidences, with a state wide view, this is likely to be negligible.	**L**	**MH**
22. Change land use?	Willows are associated with waterways and not recorded as invaders of pasture or crops in the extensive literature. Whilst control may be required (see Q. 23) there is little risk that land use would need to change as a consequence of their invasion of agricultural land.	**L**	**H**
23. Increase harvest costs?	***S.* x *sepulcralis*** tend to be confined to riverbanks (Carr, 1996), which makes them unlikely to have a negative impact on agriculture.	**L**	**MH**
24. Disease host/vector?	Not found in the extensive literature.	**L**	**H**

* The weed risk assessment of this taxon includes *S. sepulcralis* var. *chrysocoma*.

References cited:

Agriculture & Resource Management Council of Australia & New Zealand (ARMCANZ) 2001, *Weeds of National Significance Willow (Salix taxa, excluding* S, babylonica, S, *x* calodendron and S. *x* reichardtii*) Strategic Plan*, National Weeds Strategy Executive Committee, Launceston.

Aiken SG, Dallwitz MJ, Consaul LL, McJannet CL, Gillespie LJ, Boles RL, Argus GW, Gillett JM, Scott PJ, Elven R, LeBlanc MC, Brysting AK & Solstad H 1999, *Flora of the Canadian Arctic Archipelago: Descriptions, Illustration, Identification , and Information Retrieval*, Memorial University of Newfoundland, viewed: 16/02/2006, www.mun.ca/biology/delta/acrticf/_ca/ www/wl.htm.

Bailey LH & Bailey LZ 1976 *Hortus Third*, Macmillan, New York & London.

Besaans (ed.) 1995, *Plant Protection News* vol. 47, pp. 20-24.

Carcaillet C, Bergeron Y, Richard PJH, Frechette B, Gauthier S & Prairie YT 2001 'Change of fire frequency in the eastern Canadian boreal forests during the Holocene: does vegetation compoisition or climate trigger the fire regime?' *Journal of Ecology*, vol. 89, p. 930-946.

Carr GW 1996, 'Salix,' in Walsh NG & Entwisle TJ (Eds.), F*lora of Victoria*, Vol. 3, Inkata Press, Melbourne.

Carr, GW, Yogovic, JV & Robinson, KE 1992, *Environmental Weed Invasions in Victoria*, Department of Conservation and Environment, Vic.

Cody WJ 1996, *Flora of the Yukon Territory*, NRC Research Press, Ottowa.

Cremer KW 1995, *Willow Identification for river management in Australia*, CSIRO Division of Forestry, Orange, NSW.

Cremer K 1999 *Willow Management for Australian Rivers* CSIRO Forestry and Forest Products, Kingston ACT.

Cremer, K 2001 *Exterminate Wild Pussy Willows and its most invasive relative,s* CSIRO Forestry and Forest Products, Kingston ACT.

Crouch RJ & Honeyman MN 1986, 'The relative salt tolerance of willow cuttings,' *Journal of Soil Conservation*, vol 42(2), p. 103-104.

Davis PH 1982, *Flora of Turkey and the east Aegean Islands, Vol. 7, Edinburgh Uni Press, Edinburgh.*

Fircks HA von, Daurin A (ed.), Junttila O (ed.), Nilsen J 1985 'Frost hardiness of fast-growing *Salix* species,' *Plant production in the north. Proceeding from 'Plant adaptation workshop,'* Norway.

Haines A 2004 Salix myrcoides *(bayberry willow) Conservation and Research Plan for New England*, New England Flower Society, Framingham, Massachusetts, USA.

Henderson L 1991 'Alien invasive *Salix* spp. (willows) in the grassland biome of South Africa,' *South African Foresty Journal*, vol. 157, p. 91-95.

Hitchcock CL & Cronquist A 1964, *Vascular Plants of the Pacific Northwest (Part 2)*, University of Washington Press, Seattle & London.

Howard RA 1988,*Flora of the Lesser Antilles*, Vol. 4, Arnold Arboretum, Harvard Uni, Jamaica Plain, Massachusetts.

Holm L et al 1979, *A geographical atlas of world weeds*, Wiley, New York.

Kennedy SA, Ganf FF & Walker KF 2003, 'Does salinity influence the distribution of exotic willows (*Salix* spp.) along the Lower River Murray?' *Marine and Freshwater Research*, vol 54, p. 825-831.

Ladson A, Gerrish G, Carr G, Thexton E 1997, *Willows Along Victorian Waterways*, Waterways Unit, Deparment of Natural Resources and Environment, Vic, Australia.

Maloney RF, Keedwell, RJ, Wells NJ, Reergen AL & Nilsson RG 1999, 'Effect of willow removal on habitat use by five birds of braided rivers, MrKenzie Basin, New Zealand, *New Zealand Journal of Ecology*, Vol. 23, P. 53-60.

Meikle RD 1984, *Willows and Poplars of Great Britain and Ireland*, Botanical Society of the British Isles, London.

Munz PA & Keck DD 1963, *A California Flora*, University of California Press, Berkley & LA.

Muyt A 2001,*Bush invaders of South-East Australia*, RG and FJ Richardson, Meredith, Vic.

Newsholme C 1992, *Willows: The genus Salix*, Tumber Press, Portland & Oregon.

Purtle C, Stelling F, Martin D, Grossman T, Frankenberg J, Campbell S & Dwyer C 2001a *Willow Identification Guide*, Department of Land and Water Conservation,

Purtle C, Stelling F, Martin D, Grossman T, Frankenberg J, Campbell S & Dwyer C 2001b *Willows along watercourses: an introduction*, Department of Land and Water Conservation,

Purtle C, Stelling F, Martin D, Grossman T, Frankenberg J, Campbell S & Dwyer C 2001c Department of Land and Water Conservation,

Shafroth PB, Scott ML & Friedman JM 1994, 'Establishment, sex structure & breeding system of an exotic riparian willow, *Salix* x *rubens*,' *American Midland Naturalist*, vol. 132, p. 159-172.

Srutek M, Bauer V, Klimes L & Pinosova J 1988, 'Ecology of economically important plants in the river Luznice floodplain,' *Sbornik Vysoka Skola Zemedelska*, Vol. 5(2), p. 105-118.

Standley PC & Steyermark JA 1958, *Flora of Guatemala, Vol. 24, Chicago Natural History Museum, USA.*

Swift CE 1997, *Colorado State University Cooperative Extension*, Colorado State University, viewed: 15/02/2006, www.colostate.edu/Depts/CoopExt/TRA/PLANTS/stable.html.

Uchytil, RJ 1989, Fire Effects Information System, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, viewed: 16/02/2006, www.fs.fed.us/database/feis/plants/tree/salnig/all.html.

United States Department of Agriculture (USDA) 2006 USDA Plants Database, Washington, viewed: 16/02/2006, http://plants.nrcs.usda.gov/cgi_bin/topics.cgi?earl=characteristics.html.

Scientific Name: *Salix* x *sepulcralis* Simonk.* Common name: Willows

Voss EG 1972, *Michigan Flora: A guide to the identification and occurrence of the native and naturalized seed plants of the state*, Crabrook Institute of Science, University of Michigan Herbarium, Michigan.

Walters SM et al (eds) 1989, *The European Garden Flora*, Cambridge University Press, UK.

Webb CJ, Sykes WR, Garnock-Jones PJ 1988, *Flora of New Zealand*, vo.l. 4, Manaaki Whenua Press, NZ

Zallar S nd, *Botanical Characteristics of the Willows*, Soil Conservation Authority, Kew.

Revisions

Date	Revised by	Revision