

**Family:** *Proteaceae*

**Taxon:** *Hakea salicifolia*

**Synonym:** *Embothrium salicifolium* Vent.  
*Embothrium salignum* Andrews  
*Hakea saligna*

**Common Name:** willow hakea

<b>Questionnaire :</b>	current 20090513	<b>Assessor:</b>	Patti Clifford	<b>Designation:</b> H(HPWRA)
<b>Status:</b>	Assessor Approved	<b>Data Entry Person:</b>	Patti Clifford	<b>WRA Score</b> 13
101	Is the species highly domesticated?		y=-3, n=0	n
102	Has the species become naturalized where grown?		y=1, n=-1	
103	Does the species have weedy races?		y=1, n=-1	
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"		(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data		(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)		y=1, n=0	n
204	Native or naturalized in regions with tropical or subtropical climates		y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?		y=-2, ?=-1, n=0	y
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)	y
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs		y=1, n=0	n
402	Allelopathic		y=1, n=0	
403	Parasitic		y=1, n=0	n
404	Unpalatable to grazing animals		y=1, n=-1	
405	Toxic to animals		y=1, n=0	n
406	Host for recognized pests and pathogens		y=1, n=0	
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0	
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0	y

411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	y
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	
801	Prolific seed production (>1000/m2)	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score **13**

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**Supporting Data:**

101	2011. WRA Specialist. Personal Communication.	No evidence of domestication that reduces invasiveness.
102	2011. WRA Specialist. Personal Communication.	N/A
103	2011. WRA Specialist. Personal Communication.	N/A
201	2011. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database Index]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	Native range: Australia - New South Wales, Queensland.
202	2011. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database Index]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	Native range: Australia - New South Wales, Queensland.
203	2011. Dave's Garden. Plant files: willow-leaved Hakea - Hakea salicifolia. Dave's Garden, <a href="http://davesgarden.com/guides/pf/go/56274/">http://davesgarden.com/guides/pf/go/56274/</a>	USDA Hardiness zones: 8-9.
203	2011. Plant this. Hakea salicifolia willow leaf Hakea Proteaceae. Plant This, <a href="http://plantthis.com/plant-information.asp?gardener=15776&amp;tabview=design&amp;plantSpot=0">http://plantthis.com/plant-information.asp?gardener=15776&amp;tabview=design&amp;plantSpot=0</a>	USDA Hardiness zones: 8-10.
204	2011. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database Index]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	Native range: Australia - New South Wales, Queensland.
205	1987. Richardson, D.M./Van Wilgen, B.W./Mitchell, D.T.345-354. Aspects of the reproductive ecology of four Australian Hakea species (Proteaceae) in South Africa. <i>Oecologia</i> . 17: 345-354.	Hakea salicifolia was introduced to the South African fynbos shrublands between 1840-1860.
205	1992. Williams, P.A.. Hakea salicifolia: biology and role in succession in Abel Tasman National Park, New Zealand. <i>Journal of the Royal Society of New Zealand</i> . 22: 1-18. <a href="http://books.google.com/books?id=zqw4AAAAIAAJ&amp;pg=PA1&amp;dq=hakea+salicifolia&amp;hl=en&amp;ei=9M6">http://books.google.com/books?id=zqw4AAAAIAAJ&amp;pg=PA1&amp;dq=hakea+salicifolia&amp;hl=en&amp;ei=9M6</a>	Hakea salicifolia was introduced to New Zealand in 1908 for hedges.
301	2008. Proches, S./Wilson, J.R.U./Richardson, D.M./Chown, S.L.. Herbivores, but not other insects, are scarce on alien plants. <i>Austral Ecology</i> . 33: 691-700.	Hakea salicifolia is naturalized in the Cape Floristic Region, South Africa.
302	2011. WRA Specialist. Personal Communication.	Scored as environmental weed.
303	2011. Protea Atlas Project. Needlebushes - Hakea. Protea Atlas Project, <a href="http://protea.worldonline.co.za/default.htm">http://protea.worldonline.co.za/default.htm</a>	Invading pine plantations at Grabouw, Fynbos near Natures Valley and grassland in Swaziland. [no evidence of control or impacts]
304	2005. Marchante, E./Marchante, H.. Hakea salicifolia (Vent.) B.L. Burtt - plantas invasoras em Portugal. <a href="http://www.uc.pt/invasoras">www.uc.pt/invasoras</a>	Hakea salicifolia is invasive in Portugal where it forms dense stands and changes the vegetation structure.
304	2010. Macalister, A.. Management plan: wilding exotic trees on d'Urville Island, Marlborough Sounds. Marlborough District Council,	Pinus pinaster and Hakea salicifolia are also notable exotic trees that are spreading on D'Urville island. An identified stand of each also presents ecological threats. Control methods are recommended in the management plan.

305	2007. Europeand and Mediterranean Plant Protection Organization. Hakea saricea (Proteaceae) silky Hakea. Europeand and Mediterranean Plant Protection Organization, <a href="http://www.eppo.org/QUARANTINE/Alert_List/invasive_plants/Hakea_sericea.htm">http://www.eppo.org/QUARANTINE/Alert_List/invasive_plants/Hakea_sericea.htm</a>	Hakea sericea is invasive in South Africa. "In the Western and Eastern Cape Provinces of South Africa, the dense and impenetrable thickets are known to severely threaten the unique endemic vegetation of the Cape, to increase fire hazards and to reduce water yields in catchements. Studies on South African fynbos type of vegetation show that invasion by H. sericea resulted in a 60 % increase in fuel load and lowered the moisture content of live foliage from 155 to 110 %."
401	2011. Barker, R.M./Haegi, L./Barker, W.R.. Hakea salicifolia Flora of Australia Online. ABRS, <a href="http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp">http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp</a>	"Upright tall shrub or small tree 3–5 m high, ?non-lignotuberous. Branchlets with several prominent longitudinal ribs, ±deep red, lenticellate, glabrous. Leaves narrowly elliptic, 8–15 cm long, 4–17 (–27) mm wide, narrowly attenuate, usually acute or acuminate, more rarely obtuse, blackened apically but scarcely mucronate, moderately appressed-sericeous with white and ferruginous hairs when young, rapidly glabrescent; young leaves darker."
402	2011. WRA Specialist. Personal Communication.	Unknown.
403	2011. Barker, R.M./Haegi, L./Barker, W.R.. Hakea salicifolia Flora of Australia Online. ABRS, <a href="http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp">http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp</a>	Not parasitic.
404	2011. WRA Specialist. Personal Communication.	Unknown.
405	2010. National Center for Biotechnology Information. PubMed. U.S. National Library of Medicine, Bethesda, Maryland <a href="http://www.ncbi.nlm.nih.gov/sites/entrez">http://www.ncbi.nlm.nih.gov/sites/entrez</a>	No evidence of toxicity.
405	2010. Specialized Information Services, U.S. National Library of Medicine. TOXNET Toxicology Data Network [Online Database]. National Institutes of Health, <a href="http://toxnet.nlm.nih.gov/">http://toxnet.nlm.nih.gov/</a>	No evidence of toxicity.
406	2011. WRA Specialist. Personal Communication.	Unknown.
407	2010. National Center for Biotechnology Information. PubMed. U.S. National Library of Medicine, Bethesda, Maryland <a href="http://www.ncbi.nlm.nih.gov/sites/entrez">http://www.ncbi.nlm.nih.gov/sites/entrez</a>	No evidence of allergies or toxicity.
407	2010. Specialized Information Services, U.S. National Library of Medicine. TOXNET Toxicology Data Network [Online Database]. National Institutes of Health, <a href="http://toxnet.nlm.nih.gov/">http://toxnet.nlm.nih.gov/</a>	No evidence of allergies or toxicity.
408	2011. iLandscape. Saris Hakea salicifolia. iLandscape, <a href="http://www.ilandscape.com.au/product/view/8/53/241/SARIS---Hakea-salicifolia">http://www.ilandscape.com.au/product/view/8/53/241/SARIS---Hakea-salicifolia</a>	Fire retardant.
409	2011. Dave's Garden. Plant files: willow-leaved Hakea - Hakea salifolia. Dave's Garden, <a href="http://davesgarden.com/guides/pf/go/56274/">http://davesgarden.com/guides/pf/go/56274/</a>	Sun to partial shade; light shade.
409	2011. Plant this. Hakea salifolia willow leaf Hakea Proteaceae. Plant This, <a href="http://plantthis.com/plant-information.asp?gardener=15776&amp;tabview=design&amp;plantSpot=0">http://plantthis.com/plant-information.asp?gardener=15776&amp;tabview=design&amp;plantSpot=0</a>	Hot overhead sun to dappled light.
410	2011. Plant this. Hakea salifolia willow leaf Hakea Proteaceae. Plant This, <a href="http://plantthis.com/plant-information.asp?gardener=15776&amp;tabview=design&amp;plantSpot=0">http://plantthis.com/plant-information.asp?gardener=15776&amp;tabview=design&amp;plantSpot=0</a>	Soil: ordinary to enriched; acid to alkaline.
410	2011. Snodgrass, M.. Hakea salicifolia. Organic Matters, <a href="http://www.organicmatters.com.au/hakea-salic.htm">http://www.organicmatters.com.au/hakea-salic.htm</a>	Soil: heavy and clay soil, sandy soil, moderately lime tolerant.

411	2011. Barker, R.M./Haegi, L./Barker, W.R.. Hakea salicifolia Flora of Australia Online. ABRS, <a href="http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp">http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp</a>	Upright tall shrub or small tree 3–5 m high.
412	2005. Marchante, E./Marchante, H.. Hakea salicifolia (Vent.) B.L. Burt - plantas invasoras em Portugal. <a href="http://www.uc.pt/invasoras">www.uc.pt/invasoras</a>	Hakea salifolia forms dense monospecific patches that reduce species diversity and eliminated native vegetation.
501	2011. Barker, R.M./Haegi, L./Barker, W.R.. Hakea salicifolia Flora of Australia Online. ABRS, <a href="http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp">http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp</a>	Terrestrial.
502	2011. Barker, R.M./Haegi, L./Barker, W.R.. Hakea salicifolia Flora of Australia Online. ABRS, <a href="http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp">http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp</a>	Proteaceae.
503	2011. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database Index]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	Proteaceae.
504	2011. Barker, R.M./Haegi, L./Barker, W.R.. Hakea salicifolia Flora of Australia Online. ABRS, <a href="http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp">http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp</a>	Small shrub or tree.
601	2011. WRA Specialist. Personal Communication.	No evidence.
602	2010. Macalister, A.. Management plan: wilding exotic trees on d'Urville Island, Marlborough Sounds. Marlborough District Council,	The seeds of Hakea salicifolia are long-lived with seedlings still appearing 10 years after control efforts.
603	2011. WRA Specialist. Personal Communication.	Unknown.
604	2011. WRA Specialist. Personal Communication.	Unknown.
605	2011. Protea Atlas Project. Needlebushes - Hakea. Protea Atlas Project, <a href="http://protea.worldonline.co.za/default.htm">http://protea.worldonline.co.za/default.htm</a>	Insect pollinated.
606	2011. Snodgrass, M.. Hakea salicifolia. Organic Matters, <a href="http://www.organicmatters.com.au/hakea-salic.htm">http://www.organicmatters.com.au/hakea-salic.htm</a>	Propagation: seed.
607	1987. Richardson, D.M./Van Wilgen, B.W./Mitchell, D.T.345-354. Aspects of the reproductive ecology of four Australian Hakea species (Proteaceae) in South Africa. Oecologia. 17: 345-354.	Juvenile period for Hakea salicifolia is 4 years.
701	2011. WRA Specialist. Personal Communication.	Unknown.
702	1987. Richardson, D.M./Van Wilgen, B.W./Mitchell, D.T.345-354. Aspects of the reproductive ecology of four Australian Hakea species (Proteaceae) in South Africa. Oecologia. 17: 345-354.	Hakea salicifolia was introduced to the South African fynbos shrublands between 1840-1860.
702	1992. Williams, P.A.. Hakea salicifolia: biology and role in succession in Abel Tasman National Park, New Zealand. Journal of the Royal Society of New Zealand. 22: 1-18. <a href="http://books.google.com/books?id=zqw4AAAAIAAJ&amp;pg=PA1&amp;dq=hakea+salicifolia&amp;hl=en&amp;ei=9M6">http://books.google.com/books?id=zqw4AAAAIAAJ&amp;pg=PA1&amp;dq=hakea+salicifolia&amp;hl=en&amp;ei=9M6</a>	Hakea salicifolia was introduced to New Zealand in 1908 for hedges.

702	2011. Koala Native Plants. <i>Hakea salicifolia</i> - willow leaf <i>Hakea</i> . Koala Native Plants, <a href="http://www.koalanativeplants.com.au/commerce/search/products/?product_id=haksal&amp;merchant_id=2056">http://www.koalanativeplants.com.au/commerce/search/products/?product_id=haksal&amp;merchant_id=2056</a>	Koala Native Plant nursery has <i>Hakea salicifolia</i> trees available online.
703	2011. WRA Specialist. Personal Communication.	No evidence of produce contamination.
704	1987. Richardson, D.M./Van Wilgen, B.W./Mitchell, D.T.345-354. Aspects of the reproductive ecology of four Australian <i>Hakea</i> species (Proteaceae) in South Africa. <i>Oecologia</i> . 17: 345-354.	" <i>Hakea salicifolia</i> releases some seeds intermittently, but retains most seeds in the canopy. Each follicle contains two single-winged seeds (samaras) that are released following death of the parent plant.
705	2010. Macalister, A.. Management plan: wilding exotic trees on d'Urville Island, Marlborough Sounds. Marlborough District Council,	<i>Hakea salicifolia</i> is a vigorous spreader, with seeds wind-dispersed and long-lived, and has a preference for infertile soil and open habitat. The identified stand is in a stream draining ultramafic country and, without control, presents a significant threat to the adjacent Mineral Belt. If allowed to establish in the Mineral Belt, it will be almost impossible to eradicate. [grows along waterway]
706	1987. Richardson, D.M./Van Wilgen, B.W./Mitchell, D.T.345-354. Aspects of the reproductive ecology of four Australian <i>Hakea</i> species (Proteaceae) in South Africa. <i>Oecologia</i> . 17: 345-354.	Wind dispersed.
707	2011. Barker, R.M./Haegi, L./Barker, W.R.. <i>Hakea salicifolia</i> Flora of Australia Online. ABRS, <a href="http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp">http://www.anbg.gov.au/abrs/online-resources/flora/redirect.jsp</a>	"Fruit obliquely ovate, 2.3–3.5 cm long, 1.3–2.3 (–3) cm wide in median view, basally attenuate, with raised black pustules or 1–5 mm high blunt and black-topped warts; beak smooth or with blunt-topped warts; horns often eroded; red-brown wood zone 2.5 mm wide. Seed 17–20 mm long." [no means of attachment]
708	2011. WRA Specialist. Personal Communication.	Unknown.
801	1987. Richardson, D.M./Van Wilgen, B.W./Mitchell, D.T.345-354. Aspects of the reproductive ecology of four Australian <i>Hakea</i> species (Proteaceae) in South Africa. <i>Oecologia</i> . 17: 345-354.	Large seed production.
801	1992. Williams, P.A.. <i>Hakea salicifolia</i> : biology and role in succession in Abel Tasman National Park, New Zealand. <i>Journal of the Royal Society of New Zealand</i> . 22: 1-18. <a href="http://books.google.com/books?id=zqw4AAAAIAAJ&amp;pg=PA1&amp;dq=hakea+salicifolia&amp;hl=en&amp;ei=9M6">http://books.google.com/books?id=zqw4AAAAIAAJ&amp;pg=PA1&amp;dq=hakea+salicifolia&amp;hl=en&amp;ei=9M6</a>	There is only a slight decline in viability of the seeds that remain in follicles on the trees. <i>Hakea salicifolia</i> trees continuously support many thousands of viable seeds.
802	1987. Richardson, D.M./Van Wilgen, B.W./Mitchell, D.T.345-354. Aspects of the reproductive ecology of four Australian <i>Hakea</i> species (Proteaceae) in South Africa. <i>Oecologia</i> . 17: 345-354.	There is no viable seed bank in the soil.
802	1992. Williams, P.A.. <i>Hakea salicifolia</i> : biology and role in succession in Abel Tasman National Park, New Zealand. <i>Journal of the Royal Society of New Zealand</i> . 22: 1-18. <a href="http://books.google.com/books?id=zqw4AAAAIAAJ&amp;pg=PA1&amp;dq=hakea+salicifolia&amp;hl=en&amp;ei=9M6">http://books.google.com/books?id=zqw4AAAAIAAJ&amp;pg=PA1&amp;dq=hakea+salicifolia&amp;hl=en&amp;ei=9M6</a>	There is only a slight decline in viability of the seeds that remain in follicles on the trees. <i>Hakea salicifolia</i> trees continuously support many thousands of viable seeds.
802	2010. Macalister, A.. Management plan: wilding exotic trees on d'Urville Island, Marlborough Sounds. Marlborough District Council,	The seeds of <i>Hakea salicifolia</i> are long-lived with seedlings still appearing 10 years after control efforts.
803	2010. Macalister, A.. Management plan: wilding exotic trees on d'Urville Island, Marlborough Sounds. Marlborough District Council,	"Cut-stump method: This involves the cutting of <i>Hakea</i> plants as low as possible, preferably with all green leaves removed. Either picloram, glyphosate or metsulfuron solutions should be applied to the stump immediately after cutting the stem to prevent regrowth. Like hand-pulling, this method is labour-intensive, but can be undertaken by volunteers and untrained staff."

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- 804 1987. Richardson, D.M./Van Wilgen, B.W./Mitchell, D.T.345-354. Aspects of the reproductive ecology of four Australian *Hakea* species (Proteaceae) in South Africa. *Oecologia*. 17: 345-354. *Hakea salicifolia* may regenerate from stem-bases after fire.
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- 805 2011. WRA Specialist. Personal Communication. Unknown.
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