

<b>Taxon:</b> Banksia baxteri R. Br.	<b>Family:</b> Proteaceae
<b>Common Name(s):</b> Baxter's banksia bird's nest banksia	<b>Synonym(s):</b>

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 27 Oct 2016
<b>WRA Score:</b> -2.0	<b>Designation:</b> L	<b>Rating:</b> Low Risk

**Keywords:** Ornamental Shrub, Mediterranean Climate, Fire Prone, Serotinous, Wind-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
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)	Intermediate
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	n
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	?
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
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)	n
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		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
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	y
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
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		
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		
604	Self-compatible or apomictic	y=1, n=-1	y
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	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
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	n
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	n
801	Prolific seed production (>1000/m <sup>2</sup> )	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	[No evidence of domestication] "Near the south coast of W.A., from the Stirling Ra. to the Oldfield R. in deep white or grey sand on plains and dunes, in tall shrubland."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	Intermediate
	Source(s)	Notes
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Near the south coast of W.A., from the Stirling Ra. to the Oldfield R. in deep white or grey sand on plains and dunes, in tall shrubland." [Mediterranean Climate]

202	Quality of climate match data	High
	Source(s)	Notes
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Dave's Garden. (2016). Bird's Nest Banksia, Baxter's Banksia - <i>Banksia baxteri</i> . <a href="http://davesgarden.com/guides/pf/go/74766/">http://davesgarden.com/guides/pf/go/74766/</a> . [Accessed 26 Oct 2016]	"Hardiness: USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	Notes

Qsn #	Question	Answer
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Near the south coast of W.A., from the Stirling Ra. to the Oldfield R. in deep white or grey sand on plains and dunes, in tall shrubland."
	Australian Native Plants Nursery. (2016). <i>Banksia baxteri</i> . <a href="http://www.australianplants.com/plants.aspx?id=1163">http://www.australianplants.com/plants.aspx?id=1163</a> . [Accessed 26 Oct 2016]	"Origin: Mediterranean Climate"

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	Notes
	Moodley, D., Geerts, S., Rebelo, T., Richardson, D. M., & Wilson, J. R. (2014). Site-specific conditions influence plant naturalization: the case of alien Proteaceae in South Africa. <i>Acta Oecologica</i> , 59, 62-71	"Table 1 Introduced Proteaceae species recorded in South Africa and populations surveyed in this study" [ <i>Banksia baxteri</i> reported in 2 records in database]
	Dave's Garden. (2016). Bird's Nest <i>Banksia</i> , Baxter's <i>Banksia</i> - <i>Banksia baxteri</i> . <a href="http://davesgarden.com/guides/pf/go/74766/">http://davesgarden.com/guides/pf/go/74766/</a> . [Accessed 26 Oct 2016]	"This plant has been said to grow in the following regions: San Leandro, California"
	Breitwieser I., Brownsey P.J., Nelson W.A., Wilton A.D. eds. (2016) <i>Flora of New Zealand Online</i> . <a href="http://www.nzflora.info">www.nzflora.info</a>	<i>Banksia baxteri</i> R.Br. - Biostatus Exotic

301	Naturalized beyond native range	n
	Source(s)	Notes
	Moodley, D., Geerts, S., Rebelo, T., Richardson, D. M., & Wilson, J. R. (2014). Site-specific conditions influence plant naturalization: the case of alien Proteaceae in South Africa. <i>Acta Oecologica</i> , 59, 62-71	"Table 1 Introduced Proteaceae species recorded in South Africa and populations surveyed in this study. Three major invaders in South Africa ( <i>Hakea drupacea</i> , <i>H. gibbosa</i> and <i>H. sericea</i> ) were excluded from the list. For a full list of introduced Proteaceae in South Africa and worldwide see Moodley et al. (2013)." [ <i>Banksia baxteri</i> - Number of naturalized sites detected in this study = 0; Not recorded as naturalized]
	Randall, R.P. 2012. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R. & Lorence, D.H. 2016. <i>Flora of the Hawaiian Islands</i> . Smithsonian Institution, Washington, D.C. <a href="http://botany.si.edu/">http://botany.si.edu/</a> . [Accessed 26 Oct 2016]	To date, <i>Banksia integrifolia</i> is the only species naturalized in the Hawaiian Islands [East Maui]

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Moodley, D., Geerts, S., Rebelo, T., Richardson, D. M., & Wilson, J. R. (2014). Site-specific conditions influence plant naturalization: the case of alien Proteaceae in South Africa. <i>Acta Oecologica</i> , 59, 62-71	No evidence
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Moodley, D., Geerts, S., Rebelo, T., Richardson, D. M., & Wilson, J. R. (2014). Site-specific conditions influence plant naturalization: the case of alien Proteaceae in South Africa. <i>Acta Oecologica</i> , 59, 62-71	No evidence
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Moodley, D., Geerts, S., Rebelo, T., Richardson, D. M., & Wilson, J. R. (2014). Site-specific conditions influence plant naturalization: the case of alien Proteaceae in South Africa. <i>Acta Oecologica</i> , 59, 62-71	No evidence
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	Congeneric weed	y
	Source(s)	Notes
	Fraser, T. (2010). Can genetic diversity predict weeds? <i>What's New in Biological Control of Weeds?</i> 54(10): 4-5	"Coastal banksia ( <i>Banksia integrifolia</i> ) is an emerging weed in New Zealand and alpine wattle ( <i>Acacia pravissima</i> ) is starting to cause concern. Both species are potentially serious threats to New Zealand biodiversity yet lack of evidence to support a weedy classification means that they are not regarded uniformly across the country. In the case of coastal banksia, one North Island Regional Council enforces restrictions on its propagation while a neighbouring authority is actively planting it in reserves...Dr Houliston also compared the health of coastal banksia in Australia and New Zealand. 'The plant has a wide distribution in Australia but in some parts of its native range is so hard hit by natural enemies – herbivores and diseases – that it is hard to find a healthy plant. By contrast in New Zealand, where plants have had to undergo phytosanitary inspections prior to arriving in the country and have escaped from their natural enemies, it is doing extremely well.'"

Qsn #	Question	Answer
	Williams, P.A. 2008. Biological Success and Weediness of Some Terrestrial Weeds Not Presently in the Northland Regional Council's RPMS. Landcare Research Contract Report: LC0708/079/. Landcare Research, New Zealand	"Coastal banksia ( <i>Banksia integrifolia</i> )...Widespread coast weed in NZ. Not known as a weed elsewhere except in Western Australia where it has been introduced outside its native range...shades out native biota and competes with native species in vegetation succession."
	Moodley, D., Geerts, S., Rebelo, T., Richardson, D. M., & Wilson, J. R. (2014). Site-specific conditions influence plant naturalization: the case of alien Proteaceae in South Africa. <i>Acta Oecologica</i> , 59, 62-71	"The outcome of plant introductions is often considered in binary terms (invasive or non invasive). However, most species experience a time lag before naturalization occurs, and many species become naturalized at some sites but not at others. It is therefore important to understand the site-specific mechanisms underlying naturalization. Proteaceae is an interesting case as some species are widespread invaders, while others, despite a long history of cultivation, show no signs of naturalization. At least 26 non-native Proteaceae species have been introduced to, and are cultivated in, South Africa. We mapped populations and examined differences between naturalized and non-naturalized populations (e.g. propagule pressure, land use and bioclimatic suitability). Of the 15 species surveyed, 6 were naturalized at one or more sites. Of these, <i>Hakea salicifolia</i> is most widely cultivated, but is only naturalizing in some areas (32 naturalized populations out of 62 populations that were surveyed). We found propagule pressure to be the most important determinant of naturalization for <i>H. salicifolia</i> . However, in suboptimal climatic conditions, naturalization only occurred if micro-site conditions were suitable, i.e. there was some disturbance and water available. For the other naturalized species there were few sites to compare, but we came to similar conclusions: <i>Banksia integrifolia</i> only naturalized at the site where it was planted the longest; <i>Banksia serrata</i> only naturalized at a site influenced by fire regimes; while <i>Banksia formosa</i> naturalized at sites with high propagule pressure, absence of fires and where there is no active clearing of the plants. Naturalization of Proteaceae in South Africa appears to be strongly mediated by site-specific anthropogenic activities (e.g. many planted individuals and water availability). More broadly, we argue that invasion biology needs to focus more closely on the mechanisms by which species and pathways interact to determine the likelihood and consequence of an invasion."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Australian Biological Resources Study. (1999). <i>Flora of Australia</i> Volume 17B, Proteaceae 3, <i>Hakea</i> to <i>Dryandra</i> . CSIRO Publishing, Melbourne	[No evidence] "Shrub to 4 m, without lignotuber. Bark smooth to lightly fissured, grey-brown. Stems hirsute, glabrescent. Leaves: petiole 5–15 mm long; lamina stiff, pinnatisect with 4–7 large triangular flat lobes on each side, cuneate, 7–17 cm long, 25–75 mm wide, truncate; margins not recurved; both surfaces tomentose, glabrescent except pits in lower surface."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No evidence

Qsn #	Question	Answer
403	Parasitic	n
	Source(s)	Notes
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Shrub to 4 m, without lignotuber." [Proteaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

405	Toxic to animals	n
	Source(s)	Notes
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence from genus

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	GardensOnline. (2016). <i>Banksia baxteri</i> . <a href="http://www.gardensonline.com.au/GardenShed/PlantFinder/Show_2698.aspx">http://www.gardensonline.com.au/GardenShed/PlantFinder/Show_2698.aspx</a> . [Accessed 26 Oct 2016]	"Diseases: None of note"
	Bathgate, J. A., Barr, M. E., & Shearer, B. L. (1996). <i>Cryptodiaporthe melanocraspeda</i> sp. nov. the cause of <i>Banksia coccinea</i> canker in south-western Australia. <i>Mycological Research</i> , 100(2), 159-164	"In 1989, large numbers of <i>Banksia coccinea</i> in the south coast region of Western Australia were observed dying downward from the apical branches" ... " <i>Cryptodiaporthe melanocraspeda</i> ... was the most frequently isolated fungus from lesions from individual plants at four sites." ... "Within the region, <i>C. melanocraspeda</i> was isolated also from other Proteaceae: <i>Banksia attenuata</i> , <i>B. baxteri</i> , <i>B. grandis</i> , <i>B. speciose</i> , <i>Dryandra cuneata</i> , and <i>D. falcata</i> ."
	Shearer, B. L., & Crane, C. E. (2015). Genetic, morphological and pathogenic diversity in the canker pathogen <i>Cryptodiaporthe melanocraspeda</i> on <i>Banksia</i> . <i>Australasian Plant Pathology</i> , 44(3), 299-309	[May be an alternate host for other <i>Banksia</i> species] "Other than confirmation of pathogenicity on <i>B. baxteri</i> and <i>B. coccinea</i> (Shearer et al. 1995) and the description as a new species (Bathgate et al. 1996), morphological, pathogenic and genetic diversity within and between <i>C. melanocraspeda</i> populations is poorly understood."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	y
	Source(s)	Notes
	Wooller, S. J., Wooller, R. D., & Brown, K. L. (2002). Regeneration by three species of <i>Banksia</i> on the south coast of Western Australia in relation to fire interval. <i>Australian Journal of Botany</i> , 50(3), 311-317	[From a fire prone habitat. Burns readily & regenerates from seed. Likely would contribute to fuel load in fire prone habitats] "Abstract. The regeneration strategies of three <i>Banksia</i> species in relation to fire were studied over 20 years in a mediterranean heathland–shrubland on the south coast of Western Australia. <i>Banksia baueri</i> and <i>B. nutans</i> are both bushes 1–2 m high, while <i>B. baxteri</i> is a shrub 4 m high. All three species regenerated only from seed released from the canopy seed bank after fire. They did not start to flower until 6 years after fire and seed set took even longer. Differences between the species in age-related intensity of flowering were related to the rate at which each species accumulated seed in the canopy. Even plants over 40 years old were still increasing their overall canopy seed bank or replacing seeds that had been released or were no longer viable. The vegetation studied appeared to be little affected by humans historically and to have burnt only at intervals of 30–60 years or more. Consequently, although all three species needed fire to regenerate, management of fire regimes needs to allow adequate intervals between fires for the replacement of their canopy seed banks. Indeed, all three <i>Banksia</i> species studied were extinguished from one area burnt twice at an interval of 9 years. Models developed with <i>Banksia</i> species from the northern sand plains of Western Australia, where fires appear more frequent, may need modification to be applicable to all southcoastal species."

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Australian Native Plants Nursery. (2016). <i>Banksia baxteri</i> . <a href="http://www.australianplants.com/plants.aspx?id=1163">http://www.australianplants.com/plants.aspx?id=1163</a> . [Accessed 26 Oct 2016]	"Exposure: Full Sun to Partial Shade"
	GardensOnline. (2016). <i>Banksia baxteri</i> . <a href="http://www.gardensonline.com.au/GardenShed/PlantFinder/Show_2698.aspx">http://www.gardensonline.com.au/GardenShed/PlantFinder/Show_2698.aspx</a> . [Accessed 26 Oct 2016]	"Light: Full sun/Light shade"
	Dave's Garden. (2016). Bird's Nest <i>Banksia</i> , Baxter's <i>Banksia</i> - <i>Banksia baxteri</i> . <a href="http://davesgarden.com/guides/pf/go/74766/">http://davesgarden.com/guides/pf/go/74766/</a> . [Accessed 26 Oct 2016]	"Sun Exposure: Full Sun Sun to Partial Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	GardensOnline. (2016). <i>Banksia baxteri</i> . <a href="http://www.gardensonline.com.au/GardenShed/PlantFinder/Show_2698.aspx">http://www.gardensonline.com.au/GardenShed/PlantFinder/Show_2698.aspx</a> . [Accessed 26 Oct 2016]	"Soil: Most types of soil from poor to rich but best in poorer, sandy soils."



Qsn #	Question	Answer
	Australian Native Plants Nursery. (2016). <i>Banksia baxteri</i> . <a href="http://www.australianplants.com/plants.aspx?id=1163">http://www.australianplants.com/plants.aspx?id=1163</a> . [Accessed 26 Oct 2016]	"Soil: Well-drained to poorly drained soils"
<b>411</b>	<b>Climbing or smothering growth habit</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Shrub to 4 m, without lignotuber."
<b>412</b>	<b>Forms dense thickets</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Near the south coast of W.A., from the Stirling Ra. to the Oldfield R. in deep white or grey sand on plains and dunes, in tall shrubland."
	McCaw, L. (2008). Variation in age to first flowering and fruiting of <i>Banksia baxteri</i> and <i>Banksia coccinea</i> at the Stirling Range, south-western Australia. Journal of the Royal Society of Western Australia, 91: 269-273	"Thickets of <i>B. baxteri</i> and <i>B. coccinea</i> occur on white sand substrates." [Unclear if plants are components of thickets, or form dense thickets themselves. Other evidence suggest the former]
<b>501</b>	<b>Aquatic</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Western Australian Herbarium (1998–2016). FloraBase—the Western Australian Flora. Department of Parks and Wildlife. <a href="https://florabase.dpaw.wa.gov.au/">https://florabase.dpaw.wa.gov.au/</a> . [Accessed 25 Oct 2016]	"Non-lignotuberous shrub, 1.7-4 m high. Fl. yellow, Aug to Sep or Dec or Jan to May. White or grey sand. Sandplains, consolidated sand dunes."
<b>502</b>	<b>Grass</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 25 Oct 2016]	Family: Proteaceae
<b>503</b>	<b>Nitrogen fixing woody plant</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 25 Oct 2016]	Family: Proteaceae
<b>504</b>	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	<b>n</b>

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Western Australian Herbarium (1998–2016). FloraBase—the Western Australian Flora. Department of Parks and Wildlife. <a href="https://florabase.dpaw.wa.gov.au/">https://florabase.dpaw.wa.gov.au/</a> . [Accessed 25 Oct 2016]	"Non-lignotuberous shrub, 1.7-4 m high."
<b>601</b>	<b>Evidence of substantial reproductive failure in native habitat</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	[No evidence] "Near the south coast of W.A., from the Stirling Ra. to the Oldfield R. in deep white or grey sand on plains and dunes, in tall shrubland."
	Wooller, S. J., Wooller, R. D., & Brown, K. L. (2002). Regeneration by three species of <i>Banksia</i> on the south coast of Western Australia in relation to fire interval. Australian Journal of Botany, 50(3), 311-317	[No evidence] "The three species studied, <i>Banksia baxteri</i> R.Br., <i>B. baueri</i> R.Br. and <i>B. nutans</i> R.Br., occur only on the south coast of Western Australia. All were common in the study area on deep sand in sclerophyllous mediterranean shrubland and heathland at the western end of the Fitzgerald River National Park ..."
<b>602</b>	<b>Produces viable seed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wooller, S. J., & Wooller, R. D. (2001). Seed set in two sympatric banksias, <i>Banksia attenuata</i> and <i>B. baxteri</i> . Australian Journal of Botany, 49(5), 597-602	" <i>B. baxteri</i> appears to regenerate only from seed after fire and readily sets seed by autogamy"
<b>603</b>	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Sedgley, M., Sierp, M. G., & Maguire, T. L. (1994). Interspecific hybridization involving <i>Banksia prionotes</i> Lind. and <i>B. menziesii</i> R. Br. (Proteaceae). International Journal of Plant Sciences, 155(6): 755-762	[Unknown. Hybridization documented in genus] "Some presumed interspecific hybrids have been recorded, both in the wild and under cultivation (Taylor and Hopper 1988). Interspecific hybridization is of interest from ecological, taxonomic, and economic viewpoints. Hybrids often occur in disturbed habitats, when the hybrid may have a competitive advantage over the parents (Anderson 1949; Potts and Reid 1985), and so can indicate ecological imbalances. Hybridization generally occurs only between taxonomically related taxa (Williams et al. 1990; Ellis et al. 1991), and interspecific relationships can thus have implications for the evolution and systematics of a group (Erikson et al. 1983). In economic terms, the value of interspecific hybrids frequently exceeds that of the parental species in ornamental horticulture and forestry (Sedgley and Griffin 1989; Williams et al. 1990). Most of the <i>Banksia</i> interspecific hybrids recorded to date have been between east Australian species (George 1988). In this study we investigate interspecific pistilpollen interactions involving the west Australian species <i>Banksia prionotes</i> and <i>B. menziesii</i> , and morphological and biochemical characters of cv Waite Orange a putative natural interspecific hybrid between <i>B. prionotes</i> and <i>Banksia hookeriana</i> , which is registered in Australia as a cut-flower cultivar (Sedgley 1991)."

Qsn #	Question	Answer
604	Self-compatible or apomictic	y
	Source(s)	Notes
	Wooller, S. J., & Wooller, R. D. (2001). Seed set in two sympatric banksias, <i>Banksia attenuata</i> and <i>B. baxteri</i> . <i>Australian Journal of Botany</i> , 49(5), 597-602	[Autogamous] "In contrast, on <i>B. baxteri</i> , substantial seed set occurred when all animal visitors were excluded (Table 1). The large size of banksia pollen and the very fine mesh used in enclosures make wind pollination extremely improbable at the level observed. Consequently, autogamy appears to lead to seed set in <i>B. baxteri</i> , albeit at a significantly lower level than seed set on open inflorescences exposed to all visitors (Table 1; $\chi^2_1 = 7.27$ , $P < 0.01$ ) or inflorescences from which vertebrates were excluded ( $\chi^2_1 = 3.88$ , $P < 0.05$ )." ... "Thus, it appears that <i>B. baxteri</i> can set substantial seed in the absence of visitors, presumably by autogamy. This species showed additional seed set when insects had access to inflorescences, but no further increase on exposure to vertebrates."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Wooller, S. J., & Wooller, R. D. (2001). Seed set in two sympatric banksias, <i>Banksia attenuata</i> and <i>B. baxteri</i> . <i>Australian Journal of Botany</i> , 49(5), 597-602	"In contrast, on <i>B. baxteri</i> , substantial seed set occurred when all animal visitors were excluded (Table 1). The large size of banksia pollen and the very fine mesh used in enclosures make wind pollination extremely improbable at the level observed. Consequently, autogamy appears to lead to seed set in <i>B. baxteri</i> , albeit at a significantly lower level than seed set on open inflorescences exposed to all visitors" ... "Thus, it appears that <i>B. baxteri</i> can set substantial seed in the absence of visitors, presumably by autogamy. This species showed additional seed set when insects had access to inflorescences, but no further increase on exposure to vertebrates."
	Australian Biological Resources Study. (1999). <i>Flora of Australia</i> Volume 17B, Proteaceae 3, <i>Hakea</i> to <i>Dryandra</i> . CSIRO Publishing, Melbourne	"Inflorescence terminal, 3–4 cm long; involucre bracts villous, most falling early. Flowers lemon yellow, including style. Perianth 39–43 mm long including limb of 9–11 mm, hirsute outside, glabrous inside. Pistil curved, 42–49 mm long, stiff, hirsute; pollen presenter 3–4 mm long, slightly swollen near base. Old flowers persistent. Follicles few, prominent, elliptic, 35–42 mm long, 17–22 mm high, 15–20 mm wide, very convex, beaked at style-base, velvety."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Wooller, S. J., & Wooller, R. D. (2004). Seed viability in relation to pollinator availability in <i>Banksia baxteri</i> . <i>Australian Journal of Botany</i> , 52(2), 195-199	"In an earlier study of <i>Banksia baxteri</i> R.Br., a shrub that does not reproduce vegetatively (George 1981), we showed that restricting access to flowers to smaller animal visitors reduced the proportion of inflorescences that set fruit (Wooller and Wooller 2001)."

607	Minimum generative time (years)	2
	Source(s)	Notes

Qsn #	Question	Answer
	Witkowski, E. T. F., Lamont, B. B., & Connell, S. J. (1991). Seed Bank Dynamics of Three Co-Occurring Banksias in South Coastal Western Australia: the Role of Plant Age, Cockatoos, Senescence and Interfire Establishment. <i>Australian Journal of Botany</i> , 39(4), 385-397	"Age to first flowering was 3 years for all species."
	Wooller, S. J., Wooller, R. D., & Brown, K. L. (2002). Regeneration by three species of Banksia on the south coast of Western Australia in relation to fire interval. <i>Australian Journal of Botany</i> , 50(3), 311-317	"At Site A, inflorescences were first recorded after 5 years on <i>B. baxteri</i> ..." ... "In <i>B. baxteri</i> , one third of plants had set no seed 12 years after fire."
	McCaw, L. (2008). Variation in age to first flowering and fruiting of <i>Banksia baxteri</i> and <i>Banksia coccinea</i> at the Stirling Range, south-western Australia. <i>Journal of the Royal Society of Western Australia</i> , 91: 269-273	"First flowers appeared on <i>B. baxteri</i> by the age of 54 months but it took 93 months for at least 50% of plants to flower and 157 months for >90% of plants to flower (Fig. 2)." ... "Witkowski et al. (1991) reported that coastal populations of <i>B. baxteri</i> and <i>B. coccinea</i> at Hopetoun flowered for the first time 36 months after fire and produced fertile cones after 60 and 36 months respectively."
	Moodley, D. (2013). Determinants of introduction and invasion success for Proteaceae. MSc Thesis. Stellenbosch University, Stellenbosch, South Africa	[2 years] "Table S4. Raw data of all introduced, naturalized and invasive species and the fourteen traits that were measured." [Banksia baxteri - Maturity = 2; The number of years a species takes to first flowering]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Australian Biological Resources Study. (1999). <i>Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra</i> . CSIRO Publishing, Melbourne	[Seeds relatively large and lack means of external attachment] "Seeds obovate, 30–32 mm long; seed body broadly obovate, 12–14 mm long, 11–13 mm wide, smooth outside, covered with thin processes on inner face."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	The National Gardening Association. (2016). The Q&A Archives: Drought tolerant shrub for shade. <a href="http://garden.org/nga/searchqa/answer/42395/">http://garden.org/nga/searchqa/answer/42395/</a> . [Accessed 27 Oct 2016]	"Grown commercially for cut flowers."
	Australian Seed. (2016). <i>Banksia baxteri</i> . <a href="https://australianseed.com/shop/item/banksia-baxteri-">https://australianseed.com/shop/item/banksia-baxteri-</a> . [Accessed 27 Oct 2016]	[Seeds sold online] "Birds Nest Banksia Family: Proteaceae Characteristics: Small tree 3m spread 2m Seeds per packet: 5"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Australian Biological Resources Study. (1999). <i>Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra</i> . CSIRO Publishing, Melbourne	"Seeds obovate, 30–32 mm long; seed body broadly obovate, 12–14 mm long, 11–13 mm wide, smooth outside, covered with thin processes on inner face." [No evidence, and seeds relatively large]

704	Propagules adapted to wind dispersal	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Moodley, D. (2013). Determinants of introduction and invasion success for Proteaceae. MSc Thesis. Stellenbosch University, Stellenbosch, South Africa	"Proteaceae are predominantly wind dispersed (Table S4)," ... "Table S4. <i>Banksia baxteri</i> - Dispersal = Wind]

705	Propagules water dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Seeds obovate, 30–32 mm long; seed body broadly obovate, 12–14 mm long, 11–13 mm wide, smooth outside, covered with thin processes on inner face." ... "in deep white or grey sand on plains and dunes, in tall shrubland." [Unlikely. Occurs in dry habitats. Not found in riparian habitats]

706	Propagules bird dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	Moodley, D. (2013). Determinants of introduction and invasion success for Proteaceae. MSc Thesis. Stellenbosch University, Stellenbosch, South Africa	"Proteaceae are predominantly wind dispersed (Table S4)," ... "Table S4. <i>Banksia baxteri</i> - Dispersal = Wind]
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Seeds obovate, 30–32 mm long; seed body broadly obovate, 12–14 mm long, 11–13 mm wide, smooth outside, covered with thin processes on inner face." [No adaptations for bird dispersal]

707	Propagules dispersed by other animals (externally)	n
	<b>Source(s)</b>	<b>Notes</b>
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Seeds obovate, 30–32 mm long; seed body broadly obovate, 12–14 mm long, 11–13 mm wide, smooth outside, covered with thin processes on inner face." [No evidence, & no means of external attachment]

708	Propagules survive passage through the gut	n
	<b>Source(s)</b>	<b>Notes</b>
	Wooller, S. J., & Wooller, R. D. (2001). Seed set in two sympatric banksias, <i>Banksia attenuata</i> and <i>B. baxteri</i> . Australian Journal of Botany, 49(5), 597-602	"Also Witkowski et al. (1991) recorded a particularly high rate of seed predation (35–42%) in <i>B. baxteri</i> . In this context, the ability of <i>B. baxteri</i> to set seed without the need for animal visitors might compensate for the rapid turnover of unpredated seeds within its canopy seed bank,..." [Seeds unlikely to be consumed by vertebrates, with the possible exception of seed predators that would more likely destroy, rather than disperse, seeds internally.]

Qsn #	Question	Answer
801	Prolific seed production (>1000/m <sup>2</sup> )	n
	Source(s)	Notes
	Witkowski, E. T. F., Lamont, B. B., & Connell, S. J. (1991). Seed Bank Dynamics of Three Co-Occurring Banksias in South Coastal Western Australia: the Role of Plant Age, Cockatoos, Senescence and Interfire Establishment. Australian Journal of Botany, 39(4), 385-397	"Table 2. Selected reproductive traits (means of last 5 years $\pm$ s.d.) of three co-occurring Banksia species of two ages (10 and 21 years) within a single stand" [21-year old <i>Banksia baxteri</i> trees are reported to produce $4674 \pm 1265$ seeds/year, but only $581 \pm 262$ viable seeds/plant]

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Witkowski, E. T. F., Lamont, B. B., & Connell, S. J. (1991). Seed Bank Dynamics of Three Co-Occurring Banksias in South Coastal Western Australia: the Role of Plant Age, Cockatoos, Senescence and Interfire Establishment. Australian Journal of Botany, 39(4), 385-397	[Forms a canopy seed bank] "Seed bank dynamics of three co-occurring, non-sprouting Banksia species ( <i>B. baxteri</i> , <i>B. speciosa</i> and <i>B. coccinea</i> ) in patch-burnt scrub-heath (aged 10 and 21 years) were studied in the southern sandplains of Western Australia. In the younger plants, canopy seed storage was highest in <i>B. coccinea</i> . However, 21-year-old <i>B. coccinea</i> stored an order of magnitude fewer seeds than the other species and no more than young <i>B. coccinea</i> . Seed storage per year increased exponentially with plant age in <i>B. speciosa</i> and <i>B. baxteri</i> , whereas a quadratic function, peaking at 16 years, best described seed storage in <i>B. coccinea</i> . Degree of serotiny was lowest in <i>B. coccinea</i> ."

Qsn #	Question	Answer
803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

Qsn #	Question	Answer
804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	Notes
	Australian Biological Resources Study. (1999). Flora of Australia Volume 17B, Proteaceae 3, Hakea to Dryandra. CSIRO Publishing, Melbourne	"Follicles typically opening with fire. Killed by fire and regenerates from seed."
	Wooller, S. J., & Wooller, R. D. (2001). Seed set in two sympatric banksias, <i>Banksia attenuata</i> and <i>B. baxteri</i> . Australian Journal of Botany, 49(5), 597-602	"In contrast, <i>B. baxteri</i> appears to regenerate only from seed after fire and readily sets seed by autogamy. Although some follicles of <i>B. baxteri</i> opened within a few years after formation and about half had opened within 10 years, no seedlings of this species were ever recorded except just after fire."
	The National Gardening Association. (2016). The Q&A Archives: Drought tolerant shrub for shade. <a href="http://garden.org/nga/searchqa/answer/42395/">http://garden.org/nga/searchqa/answer/42395/</a> . [Accessed 27 Oct 2016]	[Does not tolerate pruning of older stems] "The foliage and flowers of this plant are used in the Australian cut flower trade where it has been found that the plant responds well to light pruning but not to pruning of older heavier stems much over 1/2" inch thick."

Qsn #	Question	Answer
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No evidence from the Hawaiian Islands

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**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Other *Banksia* species have become invasive
- From fire prone ecosystems and may increase fire risk
- Reported to form thickets in native range
- Tolerates many soil types
- Reproduces by seeds
- Self-compatible
- May reach reproductive maturity in 2+ years
- Seeds dispersed by wind & intentionally by people
- Forms canopy stored seed bank (serotiny)

## Low Risk Traits

- No reports of invasiveness or naturalization, but limited evidence of widespread introduction outside native range
- Unarmed (no spines, thorns or burrs)
- Non-toxic
- Ornamental
- Not reported to spread vegetatively
- Seeds relatively large & unlikely to be inadvertently dispersed
- Does not tolerate fire or heavy pruning