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Health Inspection
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Version 1



Weed Risk Assessment for *Hakea salicifolia* (Vent.) B. L. Burtt. (Proteaceae) – Finger hakea



Left: Habit of *H. salicifolia*. Right: Leaves and follicles of *H. salicifolia* (source of both images: Trevor James, <http://www.nzflora.info/Index.html>).

Agency Contact:

Plant Epidemiology and Risk Analysis Laboratory
Center for Plant Health Science and Technology

Plant Protection and Quarantine
Animal and Plant Health Inspection Service
United States Department of Agriculture
1730 Varsity Drive, Suite 300
Raleigh, NC 27606

Introduction Plant Protection and Quarantine (PPQ) regulates noxious weeds under the authority of the Plant Protection Act (7 U.S.C. § 7701-7786, 2000) and the Federal Seed Act (7 U.S.C. § 1581-1610, 1939). A noxious weed is defined as “any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment” (7 U.S.C. § 7701-7786, 2000). We use weed risk assessment (WRA)—specifically, the PPQ WRA model (Koop et al., 2012)—to evaluate the risk potential of plants, including those newly detected in the United States, those proposed for import, and those emerging as weeds elsewhere in the world.

Because the PPQ WRA model is geographically and climatically neutral, it can be used to evaluate the baseline invasive/weed potential of any plant species for the entire United States or for any area within it. As part of this analysis, we use a stochastic simulation to evaluate how much the uncertainty associated with the analysis affects the model outcomes. We also use GIS overlays to evaluate those areas of the United States that may be suitable for the establishment of the plant. For more information on the PPQ WRA process, please refer to the document, *Background information on the PPQ Weed Risk Assessment*, which is available upon request.

***Hakea salicifolia* (Vent.) B. L. Burtt. – Finger hakea**

Species Family: Proteaceae

Information Initiation: On November 25, 2011, Al Tasker (PPQ, National Weeds Program Coordinator) asked the PERAL Weed Team to evaluate *Hakea salicifolia* for potential listing as a Federal Noxious Weed.

Foreign distribution: *Hakea salicifolia* is native to Australia in New South Wales and Queensland (NGRP, 2012). It has been introduced to Spain (Dana et al., 2002) and is naturalized in Portugal, New Zealand, South Africa, Swaziland, and elsewhere in Australia (Howell and Sawyer, 2006; NGRP, 2012; Randall, 2007; Ross and Walsh, 2003; SNTC, 2012; Teixeira et al., 2008).

U.S. distribution and status: This species is listed for retail in Ventura, California, by a nursery specializing in Australian plants (O’Connell, 2012). We do not know when it was first introduced to the United States for cultivation, but if the “*Hakea saligna*” listed in *Hortus* (Bailey and Bailey, 1930) is a synonym of *H. salicifolia* (ANBG, 2012), then this species has been in the United States since at least 1930. It appears to be rarely cultivated here and is not known to have naturalized in the United States (Kartesz, 2012).

WRA area¹: Entire United States, including territories

1. *Hakea salicifolia* analysis

Establishment/Spread Potential *Hakea salicifolia* is a large shrub or small tree that can form dense populations (Williams, 1992). It produces wind-dispersed seeds that are released from an aerial seed bank after fire, but some are also released continuously from the canopy (Richardson et

¹ “WRA area” is the area in relation to which the weed risk assessment is conducted [definition modified from that for “PRA area” (IPPC, 2012)].

al., 1987; Williams, 1992). Because *H. salicifolia* is cultivated as a hedge plant (Anonymous, 2008; Marchante et al., 2005), some seeds may likely be dispersed unintentionally by people discarding yard waste. In New Zealand, it spread across several thousand acres in a national park (McQueen, 1993; Williams, 1992). In Portugal, it is one of the most invasive and aggressive species (Marchante et al., 2005). Yet, in South Africa, where other invasive *Hakea* species exist, *H. salicifolia* has not become a significant invader (Richardson et al., 1987). *Hakea salicifolia* does not possess any other traits that suggest a high capacity for establishment and spread, and it earned a moderate score here because of its behavior elsewhere. We had an average amount of uncertainty associated with this risk element.

Risk score = 5 Uncertainty index = 0.13

Impact Potential We found little evidence of harm caused by *H. salicifolia*. In Australia it replaces native vegetation in invaded areas (The University of Queensland, 2012), and it is an environmental weed in New Zealand (The University of Queensland, 2012) which is being controlled in some (but not all) places (Wotherspoon and Wotherspoon, 2002). Although it can convert open scrubland into closed scrub thickets, most populations of *H. salicifolia* in a New Zealand national park are being replaced by native plants, and for that reason it is not being controlled (Williams, 1992). We had an average level of uncertainty with this risk element.

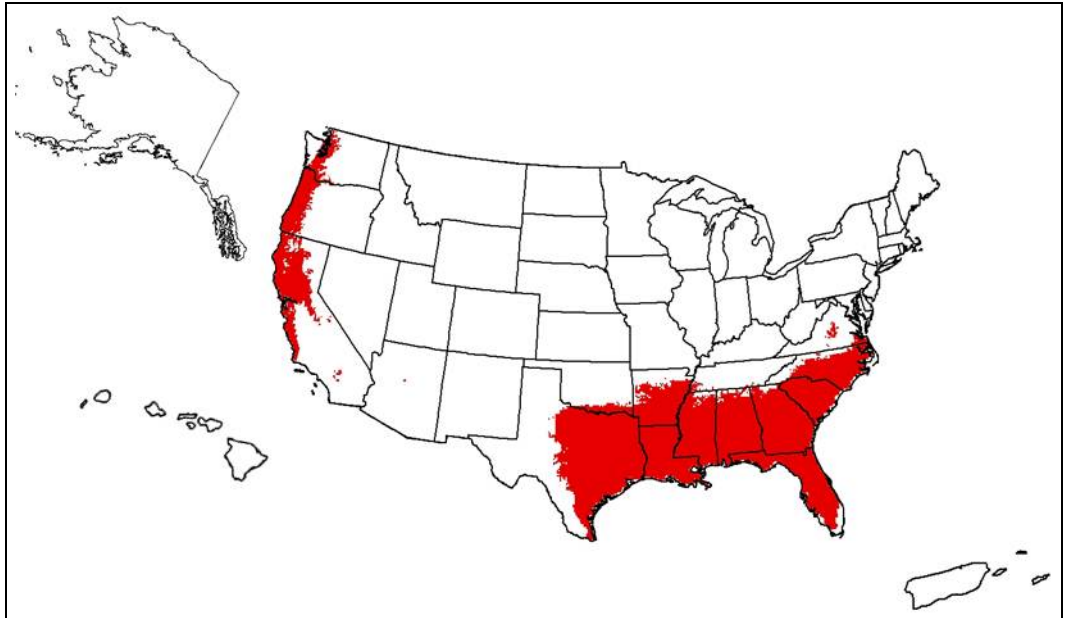
Risk score = 2.1 Uncertainty index = 0.14

Geographic Potential Based on three climatic variables, we estimate that about 15.7 percent of the United States is suitable for the establishment of *H. salicifolia* (Fig. 1). This predicted distribution is based on the species' known distribution elsewhere in the world and includes point-referenced localities and other areas of occurrence. The map for *H. salicifolia* represents the joint distribution of Plant Hardiness Zones 8-11, areas with 20-70 inches of annual precipitation, and the following Köppen-Geiger climate classes: mediterranean, humid subtropical, and marine west coast. We are uncertain about whether or not *H. salicifolia* can survive in hardiness zone 8. We answered "yes" in the assessment (Appendix A) because it occurred on the edge of this zone in a few places in Australia and New Zealand (GBIF, 2012), and because a gardening forum indicated it was hardy to zone 8 (DavesGarden, 2012).

The area estimated likely represents a conservative estimate as it uses three climatic variables to estimate the area of the United States that is suitable for establishment of the species. Other environmental variables, such as soil and habitat type, may further limit the areas in which this species is likely to establish. Also, *H. salicifolia* is likely to only be able to survive in the warmer regions of zone 8.

Entry Potential We did not assess *H. salicifolia*'s entry potential because this species is already present in the United States (O'Connell, 2012).

Figure 1. Predicted distribution of *Hakea salicifolia* in the United States. Map insets for Alaska, Hawaii, and Puerto Rico are not to scale.



2. Results and Conclusion

Model Probabilities: P(Major Invader) = 15.5%
P(Minor Invader) = 70.3%
P(Non-Invader) = 14.1%

Risk Result = Evaluate Further
Secondary Screening = High Risk

Figure 2. *Hakea salicifolia* risk score (black box) relative to the risk scores of species used to develop and validate the PPQ WRA model (other symbols). See Appendix A for the complete assessment.

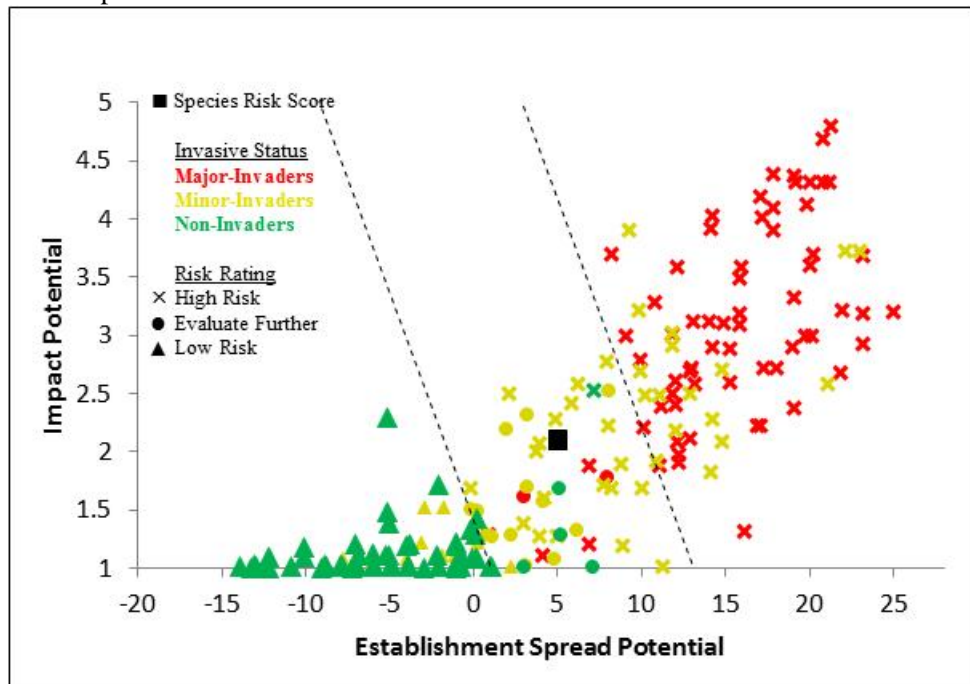
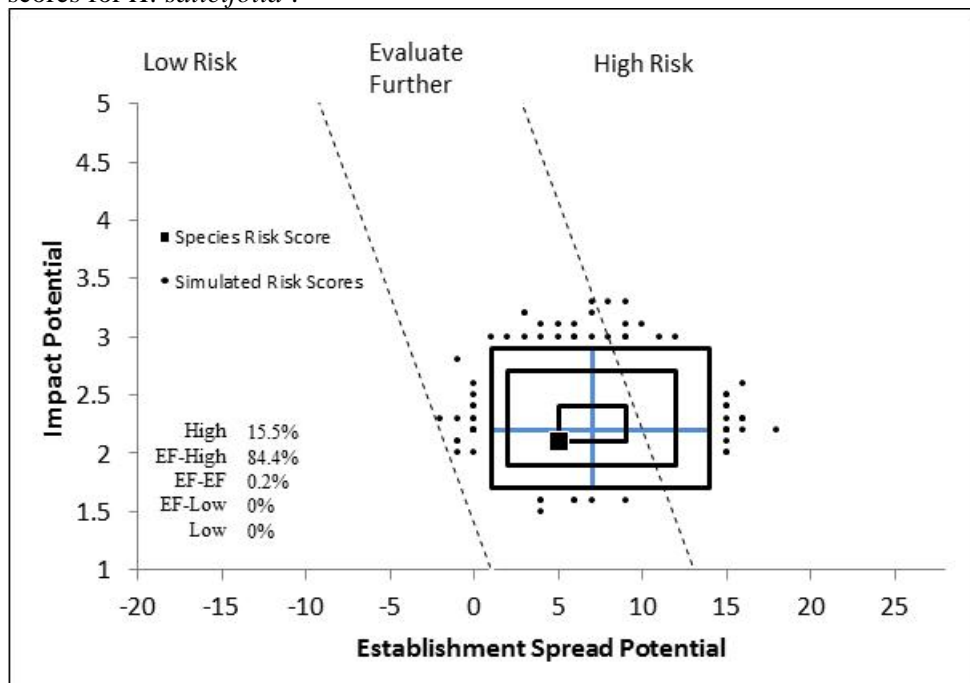


Figure 3. Monte Carlo simulation results (N=5,000) for uncertainty around the risk scores for *H. salicifolia*^a.



^aThe blue “+” symbol represents the medians of the simulated outcomes. The smallest box contains 50 percent of the outcomes, the second 95 percent, and the largest 99 percent.

3. Discussion

The result of the weed risk assessment for *H. salicifolia* was “Evaluate Further” (Fig. 2) but because this species has demonstrated an ability to be invasive elsewhere (naturalized and spreading), our secondary screening tool gave a final determination of “High Risk.” Evaluations with four other weed risk assessment systems have resulted in similar conclusions. Analysis with the Parker system (Parker et al., 2007) and the Weber and Gut system (Andreu and Vila 2010) resulted in moderate risk scores, while analysis with the Tucker and Richardson system for South Africa (Tucker and Richardson, 1995) and the Australian WRA for Hawaii (University of Hawaii, 2012) resulted in high risk scores. In our uncertainty simulation, 84.4 percent of the simulated risk scores initially resulted in determinations of “Evaluate Further” and were later classified as “High Risk” following secondary screening (Fig. 3).

Given its risk rating and potentially long history in the United States (see *H. saligna* in Bailey and Bailey, 1930), it is puzzling that *H. salicifolia* has not yet naturalized in the United States, particularly in the mediterranean climate of California. Some possible explanations include the following: 1) minor cultivation has limited its opportunities to escape; 2) seed predators here have prevented escape; or 3) where grown, the fire regime has not been conducive for naturalization. Without additional data on how U.S. environmental conditions are interacting with the species’ biology to determine its invasive potential, it is difficult to speculate beyond this.

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Appendix A. Weed risk assessment for *Hakea salicifolia* (Vent.) B. L. Burt. (Proteaceae). The following information was obtained from the species' risk assessment, which was conducted using Microsoft Excel. The information shown in this appendix was modified to fit on the page. The original Excel file, the full questions, and the guidance to answer the questions are available upon request.

Question ID	Answer - Uncertainty	Score	Notes (and references)
ESTABLISHMENT/SPREAD POTENTIAL			
ES-1 (Status/invasiveness outside its native range)	f - negl	5	Native to eastern Australia in New South Wales and Queensland (NGRP, 2012). Introduced to Spain (Dana et al., 2002). Naturalized in Portugal, New Zealand, South Africa, Swaziland, southern Europe, and elsewhere in Australia (Howell and Sawyer, 2006; NGRP, 2012; Randall, 2007; Ross and Walsh, 2003; SNTC, 2012; Teixeira et al., 2008). Used extensively as a hedge plant in South Africa, but shows no evidence of spreading into natural vegetation (Richardson et al., 1987). Naturalized in Victoria and South Australia, Australia (Groves et al., 2005; The University of Queensland, 2012). Invasive in northern Australia and New Zealand; the term "invasive" implies spread in this reference (Weber, 2003). Spreading by seed, but the source is not clear if it is from established plants or from naturalized populations (Anonymous, 2008). One of the most invasive and aggressive invasive species in Portugal (Marchante et al., 2005). Spreading, or at least historically has spread, in a national park in New Zealand to cover several thousand acres (McQueen, 1993; Williams, 1992). Both alternate choices for the Monte Carlo simulation were "e."
ES-2 (Is the species highly domesticated)	n - low	0	Although this species is cultivated, there is no evidence it has been domesticated to reduce weed traits. Cultivated in Australia (Groves et al., 2005). Commonly planted ornamental, windbreak, and hedge tree (Anonymous, 2008; Marchante et al., 2005). Introduced as a hedge plant to New Zealand (Williams, 1992). The cultivar 'Gold Medal' is available in the United States, along with the regular species (O'Connell, 2012).
ES-3 (Weedy congeners)	y - negl	1	<i>Hakea sericea</i> and <i>H. gibbosa</i> are major weeds in South Africa (Holm et al., 1979; Nel et al., 2004). Several <i>Hakea</i> species are described as displacing species, forming dense thickets, reducing water availability, and changing habitat structure (Weber, 2003; Wells et al., 1986).
ES-4 (Shade tolerant at some stage of its life cycle)	n - high	0	Light-dependent species that relies on canopy disturbance to establish (Weber, 2003). Populations do not regenerate under closed-canopy conditions; however, seedlings are reported to be shade tolerant (Williams, 1992). Although shade tolerance of seedlings supports an answer of "yes" based on the question-specific guidance, answering "no" based on the comments that this species requires canopy disturbance to regenerate. Using "high" uncertainty because it is not clear whether the shade tolerance of seedlings is due to inherent tolerance or lingering reserves in the cotyledons.
ES-5 (Climbing or smothering growth form)	n - negl	0	Erect shrub growing to 4-6 meters tall (Richardson et al., 2006; Weber, 2003; Williams, 1992).
ES-6 (Forms dense thickets)	y - low	2	Forms dense stands (Weber, 2003). In a New Zealand national park, " <i>H. salicifolia</i> now forms dense pure stands" with up to 0.8 stems per square meter (Williams, 1992). In a study comparing

Question ID	Answer - Uncertainty	Score	Notes (and references)
			four species of exotic <i>Hakea</i> in South Africa, the authors found that this species does not form dense thickets in South Africa (Richardson et al., 1987). Answering "yes" based on its behavior in New Zealand, where climatic conditions may be more suitable for its survival (Williams, 1992).
ES-7 (Aquatic)	n - negl	0	Species is a terrestrial shrub (Richardson et al., 2006; Weber, 2003; Williams, 1992), not an aquatic.
ES-8 (Grass)	n - negl	0	Not a grass; species is in the Proteaceae family (Henderson, 2001; NGRP, 2012).
ES-9 (Nitrogen-fixing woody plant)	n - negl	0	No evidence. Not in a plant family known to fix nitrogen (Martin and Dowd, 1990).
ES-10 (Does it produce viable seeds or spores)	y - negl	1	Regenerates from seed in naturalized populations (Williams, 1992). Because this information came from a detailed community/population study of this species, using "negl" uncertainty.
ES-11 (Self-compatible or apomictic)	? - max	0	Unknown. "Proteaceous species are commonly considered to be primarily outcrossing and many, including <i>H. carinata</i> , have protandrous flowers that should enhance outcrossing. <i>H. carinata</i> has been shown, however, to be capable of self fertilisation," and in this study populations were substantially selfing (Starr and Carthew, 1998). <i>Hakea erinacea</i> is self-compatible, while <i>H. cristata</i> strongly preferred non-self-pollen (Lamont et al., 1998).
ES-12 (Requires special pollinators)	n - low	0	Insect pollinated (Mast et al., 2012). This species is most likely pollinated by honey bees in New Zealand (Butz Huryn and Moller, 1995). The congeners <i>H. erinacea</i> and <i>H. cristata</i> are visited by honeybees and other flying insects (Lamont et al., 1998).
ES-13 (Minimum generation time)	d - low	-1	Juvenile period is four years (Richardson et al., 1987). Both alternate answers for the Monte Carlo simulation are "c."
ES-14 (Prolific reproduction)	n - low	-1	Like other <i>Hakea</i> species, <i>H. salicifolia</i> retains fruit (follicles) in the canopy until it is killed by a fire. In dense stands, where plants are typically single-stemmed, trees have a canopy width of about 2-4 meters, while in isolated individuals canopies measure up to 6 meters in width (Williams, 1992). In more open sites, individuals are multi-stemmed and branches arch outwards forming a dome (Williams, 1992). "Bushes commonly have about 1,000 follicles by the time they reach 5-10 cm stem diameter at perhaps 10 years, and 13,000 at 15-20 cm diameter at perhaps 30 years" (Williams, 1992). Assuming plants begin reproducing at four years of age, then plants produce from 166 to 500 follicles per year per square meter. Because each follicle has 2 seeds (Weber, 2003), then this estimate represents 332 to 1000 seeds per year per square meter. However, this does not account for the size of the canopy, which is more than 1 square meter. Thus, it seems unlikely that <i>H. salicifolia</i> has prolific reproduction. Other data: This species does not produce as much seed as <i>H. sericea</i> (Richardson et al., 1987). Seed viability is 100 percent in young follicles and 92 percent in old follicles (Williams, 1992). Dense stands with up to 0.8 stems per square meter support up to 500-600 closed follicles per square meter, where follicles contain two seeds each (Williams, 1992), but this represents production over the plants life time.

Question ID	Answer - Uncertainty	Score	Notes (and references)
ES-15 (Propagules likely to be dispersed unintentionally by people)	y - high	1	This species is cultivated as a hedge and windbreak tree (Anonymous, 2008; Marchante et al., 2005). Because hedges are pruned periodically, and because seed-bearing follicles are retained in the canopy (Williams, 1992), seeds will likely be spread as cuttings are discarded in local brush dumps or other refuse areas.
ES-16 (Propagules likely to disperse in trade as contaminants or hitchhikers)	n - high	-1	Seed pods of <i>H. salicifolia</i> are used in potpourri material (Tucker et al., 2010), but it is unknown whether seeds remain viable after the addition of dyes and fragrances. Because it does not seem likely that most potpourri will be disposed outside in compost after use, and because it seems unlikely seeds would contaminate any other pathway, answering "no" with "high" uncertainty. A
ES-17 (Number of natural dispersal vectors)	1	-2	For questions ES17a-ES17e: Fruits are tardily dehiscent, woody follicles of about 3 cm length opening with two valves; each fruit contains two winged seeds of 15-20 mm length and 5-7 mm width (Weber, 2003)
ES-17a (Wind dispersal)	y - negl		This species has winged seeds that facilitate dispersal by wind (Richardson et al., 1987). Winged seeds are "presumably dispersed by wind" (Williams, 1992). <i>Hakea</i> species are wind-dispersed (Groom, 2010).
ES-17b (Water dispersal)	n - low		No evidence; this species is clearly adapted for wind dispersal.
ES-17c (Bird dispersal)	n - mod		No evidence.
ES-17d (Animal external dispersal)	n - mod		No evidence.
ES-17e (Animal internal dispersal)	n - mod		No evidence.
ES-18 (Evidence that a persistent (>1yr) propagule bank (seed bank) is formed)	y - negl	1	Some seeds are released from the canopy over time, but most are retained in a serotinous seed bank (Richardson et al., 1987; Williams, 1992). "It does not require fire to release seed from its fruits (follicles) and appears to like moist sites. In its native Australia it grows in wet sclerophyll forest and edges of rainforest—similar habitats are abundantly available" (Anonymous, 2008). No soil seed bank detected (Williams, 1992).
ES-19 (Tolerates/benefits from mutilation, cultivation or fire)	n - mod	-1	May regenerate some from stem bases after fire (Richardson et al., 1987), but there is no indication or evidence that it regenerates significantly more so than most other plant species. Canopy stored seeds are killed in fire (Richardson et al., 1987).
ES-20 (Is resistant to some herbicides or has the potential to become resistant)	n - low	0	No evidence and not listed by Heap (2012). Herbicide applications to cut stumps are recommended (Weber, 2003).
ES-21 (Number of cold hardiness zones suitable for its survival)	4	0	
ES-22 (Number of climate types suitable for its survival)	3	0	
ES-23 (Number of precipitation bands suitable for its survival)	5	0	
IMPACT POTENTIAL			
General Impacts			
Imp-G1 (Allelopathic)	n - low	0	No evidence.

Question ID	Answer - Uncertainty	Score	Notes (and references)
Imp-G2 (Parasitic)	n - negl	0	No evidence. Not a member of a family containing parasitic plants (Heide-Jorgensen, 2008; Nickrent, 2009).
Impacts to Natural Systems			
Imp-N1 (Change ecosystem processes and parameters that affect other species)	n - low	0	Evidence from a national park in New Zealand suggests that this species does not alter ecosystem properties or processes; in most sites it appears to be succumbing to natural succession dynamics (Williams, 1992). In New Zealand, it does not appear to have affected the fire regime (Williams, 1992).
Imp-N2 (Change community structure)	y - mod	0.2	Aerial photographs from several time periods show it is invading open scrub sites in a New Zealand national park and is creating a closed scrub community (Williams, 1992). We consider a change from an open to closed community to be a change in the structure of a habitat.
Imp-N3 (Change community composition)	y - low	0.2	Reduces species richness and eliminates natural vegetation (Weber, 2003). Infestations replace native vegetation in areas where it is exotic in Australia (The University of Queensland, 2012).
Imp-N4 (Is it likely to affect federal Threatened and Endangered species)	y - mod	0.1	Because this species impacts native species in Australia (The University of Queensland, 2012) and can invade natural systems (Williams, 1992), it is likely to affect threatened and endangered species in the United States.
Imp-N5 (Is it likely to affect any globally outstanding ecoregions)	n - high	0	In a New Zealand national park, " <i>H. salicifolia</i> now forms dense pure stands" with up to 0.8 stems per square meter (Williams, 1992). In all but the habitats with the thinnest soils, it is being replaced by native vegetation (Williams, 1992). This species has the potential to establish in U.S. systems recognized to be globally outstanding ecoregions (Ricketts et al., 1999). However, its behavior in New Zealand indicates most native vegetation is replacing it (Williams, 1992). Furthermore, in South Africa, where other <i>Hakea</i> species have become invasive and caused harm, this species has not been problematic or spread to any great extent (Le Maitre et al., 2008; Richardson et al., 1987).
Imp-N6 (Weed status in natural systems)	c - low	0.6	Natural areas weed in Australia (Randall, 2007). Invades sand dunes in Portugal (Marchante et al., 2005). Significant environmental weed in Victoria, Australia (Groves et al., 2005). Control strategies are provided (Weber, 2003). Being controlled to zero adult density on a New Zealand island managed for biotic diversity (Wotherspoon and Wotherspoon, 2002). In some sites in a New Zealand park, it seems it is being replaced by native species through natural succession, but in open woodland and low scrub it is still invading and should probably be controlled in case a fire increases its dominance further; currently it is not being controlled in the park (Williams, 1992). Alternate answers for the Monte Carlo simulation are both "b."
Impact to Anthropogenic Systems (cities, suburbs, roadways)			
Imp-A1 (Impacts human property, processes, civilization, or safety)	n - mod	0	No evidence.
Imp-A2 (Changes or limits recreational use of an area)	n - mod	0	No evidence.
Imp-A3 (Outcompetes, replaces, or otherwise affects desirable plants and	n - mod	0	No evidence.

Question ID	Answer - Uncertainty	Score	Notes (and references)
vegetation)			
Imp-A4 (Weed status in anthropogenic systems)	a - high	0	In Australia, it is only regarded as an environmental weed (The University of Queensland, 2012). Invades disturbed lands in Portugal, but not specifically described as a weed (Marchante et al., 2005). Alternate answers for the Monte Carlo simulation are "b" and "c."
Impact to Production Systems (agriculture, nurseries, forest plantations, orchards, etc.)			
Imp-P1 (Reduces crop/product yield)	n - mod	0	No evidence.
Imp-P2 (Lowers commodity value)	n - mod	0	No evidence.
Imp-P3 (Is it likely to impact trade)	n - mod	0	Proposed for legislation in South Africa (Macdonald et al., 2003). Regulated in Portugal (EPPO, 2006). But no evidence it is likely to a trade pathway.
Imp-P4 (Reduces the quality or availability of irrigation, or strongly competes with plants for water)	n - mod	0	No evidence.
Imp-P5 (Toxic to animals, including livestock/range animals and poultry)	n - low	0	No evidence (Burrows and Tyrll, 2001).
Imp-P6 (Weed status in production systems)	a - low	0	No evidence it is considered a production system weed. Both alternate answers for the Monte Carlo simulation are "b."
GEOGRAPHIC POTENTIAL			
Plant cold hardiness zones			
Geo-Z1 (Zone 1)	n - negl	N/A	No evidence.
Geo-Z2 (Zone 2)	n - negl	N/A	No evidence.
Geo-Z3 (Zone 3)	n - negl	N/A	No evidence.
Geo-Z4 (Zone 4)	n - negl	N/A	No evidence.
Geo-Z5 (Zone 5)	n - negl	N/A	No evidence.
Geo-Z6 (Zone 6)	n - negl	N/A	No evidence.
Geo-Z7 (Zone 7)	n - negl	N/A	No evidence.
Geo-Z8 (Zone 8)	y - high	N/A	A few points on edge in Australia and New Zealand. Hardy to zone 8 (DavesGarden, 2012).
Geo-Z9 (Zone 9)	y - negl	N/A	Australia. Hardy to zone 9 (DavesGarden, 2012).
Geo-Z10 (Zone 10)	y - negl	N/A	Australia.
Geo-Z11 (Zone 11)	y - negl	N/A	South Africa.
Geo-Z12 (Zone 12)	n - high	N/A	No evidence.
Geo-Z13 (Zone 13)	n - negl	N/A	No evidence.
Köppen-Geiger climate classes			
Geo-C1 (Tropical rainforest)	n - negl	N/A	No evidence.
Geo-C2 (Tropical savanna)	n - negl	N/A	No evidence.
Geo-C3 (Steppe)	n - high	N/A	One point on the edge in Australia.
Geo-C4 (Desert)	n - negl	N/A	No evidence.
Geo-C5 (Mediterranean)	y - negl	N/A	South Africa, Portugal.
Geo-C6 (Humid subtropical)	y - negl	N/A	South Africa, Australia.
Geo-C7 (Marine west coast)	y - negl	N/A	South Africa, Australia.
Geo-C8 (Humid cont. warm sum.)	n - negl	N/A	No evidence.

Question ID	Answer - Uncertainty	Score	Notes (and references)
Geo-C9 (Humid cont. cool sum.)	n - negl	N/A	No evidence.
Geo-C10 (Subarctic)	n - negl	N/A	No evidence.
Geo-C11 (Tundra)	n - negl	N/A	No evidence.
Geo-C12 (Icecap)	n - negl	N/A	No evidence.
10-inch precipitation bands			
Geo-R1 (0-10 inches; 0-25 cm)	n - negl	N/A	No evidence.
Geo-R2 (10-20 inches; 25-51 cm)	n - high	N/A	One point on the edge in Australia.
Geo-R3 (20-30 inches; 51-76 cm)	y - negl	N/A	South Africa, Australia.
Geo-R4 (30-40 inches; 76-102 cm)	y - negl	N/A	South Africa, Swaziland, Australia.
Geo-R5 (40-50 inches; 102-127 cm)	y - negl	N/A	Portugal, Australia.
Geo-R6 (50-60 inches; 127-152 cm)	y - negl	N/A	New Zealand. Receiving 1380 mm of annual precipitation in Abel Tasman National Park in New Zealand (Williams, 1992).
Geo-R7 (60-70 inches; 152-178 cm)	y - negl	N/A	New Zealand.
Geo-R8 (70-80 inches; 178-203 cm)	n - high	N/A	No evidence.
Geo-R9 (80-90 inches; 203-229 cm)	n - negl	N/A	No evidence.
Geo-R10 (90-100 inches; 229-254 cm)	n - negl	N/A	No evidence.
Geo-R11 (100+ inches; 254+ cm))	n - negl	N/A	No evidence.
ENTRY POTENTIAL			
Ent-1 (Plant already here)	y - negl	1	Species is being grown and sold in Ventura California by a nursery specializing in Australian plants (O'Connell, 2012).
Ent-2 (Plant proposed for entry, or entry is imminent)	-	N/A	
Ent-3 (Human value & cultivation/trade status)	-	N/A	
Ent-4 (Entry as a contaminant)			
Ent-4a (Plant present in Canada, Mexico, Central America, the Caribbean or China)	-	N/A	
Ent-4b (Contaminant of plant propagative material (except seeds))	-	N/A	
Ent-4c (Contaminant of seeds for planting)	-	N/A	
Ent-4d (Contaminant of ballast water)	-	N/A	
Ent-4e (Contaminant of aquarium plants or other aquarium products)	-	N/A	
Ent-4f (Contaminant of	-	N/A	

Question ID	Answer - Uncertainty	Score	Notes (and references)
landscape products)			
Ent-4g (Contaminant of containers, packing materials, trade goods, equipment or conveyances)	-	N/A	
Ent-4h (Contaminants of fruit, vegetables, or other products for consumption or processing)	-	N/A	Seed pods are used in potpourri (Tucker et al., 2010).
Ent-4i (Contaminant of some other pathway)	-	N/A	
Ent-5 (Likely to enter through natural dispersal)	-	N/A	