Eucalyptus pellita (Daintree Stringybark, Forest-Mahogany, Grey Gum, Large-Fruit Red-Mahogany, Red Gum, Red Stringybark, Red-Mahogany) -- FLORIDA		Answer	Score
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to FL climates (USDA hardiness zones; 0-low, 1-intermediate, 2-high)	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in regions with an average of 11-60 inches of annual precipitation	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	n	-2
3.02	Garden/amenity/disturbance weed	n	0
3.03	Weed of agriculture	n	0
3.04	Environmental weed	n	0
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	?	
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	?	
4.05	Toxic to animals	?	
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans		
4.08	Creates a fire hazard in natural ecosystems	?	
4.09	Is a shade tolerant plant at some stage of its life cycle	?	
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	y	1
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	?	
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat		
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	y	1
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation		

6.07	Minimum generative time (years)	2	0
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
7.02	Propagules dispersed intentionally by people	y	1
7.03	Propagules likely to disperse as a produce contaminant		
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed	?	
7.06	Propagules bird dispersed	n	-1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	n	-1
8.01	Prolific seed production		
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	n	-1
8.03	Well controlled by herbicides	?	
8.04	Tolerates, or benefits from, mutilation or cultivation	y	1
8.05	Effective natural enemies present in U.S.		
	Total Score	**3**	
	Implemented Pacific Second Screening	**Yes**	
	Risk Assessment Results	**Evaluate**	

	Reference	Source data
1.01		Cultivated but no evidence of selection for reduced weediness.
1.02		Skip to 2.01
1.03		Skip to 2.01
2.01	1. PERAL NAPPFAST Global Plant Hardiness (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnd.tif) & USDA Plant Hardiness Zone Map, 2012. Agricultural Research Service, U.S. Department of Agriculture. Accessed from http://planthardiness.ars.usda.gov. 2. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15948 [Accessed: 8 May 2012]). 3. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.	**No computer analysis was performed**. 1. Global plant hardiness zones (10-?) 11-12; equivalent to USDA Hardiness zones 9b-11b+ ([north?] central and south zones of Florida). 2. Native distribution: east New South Wales and east Queensland, Australia. 3. Extends from Iron Range on Cape York Peninsula, south to Coen and from north of Cooktown to south of Inghram, with a small occurrence in between in Cape Melville National Park; it also extends into the southern lowlands of New Guinea.
2.02		**No computer analysis was performed**. 1. Native range is well known; refer to 2.01 source data.
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.	1. Native distribution appears to be in at least three climatic groups (Af, Am, Aw, possibly Cwa and Cfa). 2. Altitudinal range from near sea level to 600 m (1968.5').
2.04	1. Australia's Virtual Herbarium. 2009. http://chah.gov.au/avh/index.jsp. Accessed: 9 May 2012. 2. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.	1. 800 mm-3200 mm (31.5"- 126.0"). 2. 1200 mm-3300 mm (47.2"-129.9").
2.05	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: CAB International, 2000. Forestry Compendium Global Module. Wallingford, UK: CAB International.	1. Introduced to several countries including Africa, North and South America, India and Chinia.
3.01		No evidence.
3.02		No evidence.
3.03		No evidence.
3.04		No evidence.

3.05	1. Holm, L. et al. *A Geographical Atlas of World Weeds* . John Wiley and Sons, New York. 1979.	1. The following *eucalypts* are considered principal weeds in Australia (principal weed in this context is ranked according to the importance of the weed and is usually referring to about the five most troublesome species for the crop): *E. cambageana, E. ferruginea, E. gracilis, E. marginata, E. miniata, E. pilularis, E. populnea, E. tetradonta* .
4.01		No evidence.
4.02	1. Anonymous. 2009. "Focus on Eucalypts." SAPIA NEWS No. 12. ARC-Plant Protection Research Institute, South Africa. 2. Anonymous. October 2010. Scotland, Forestry Commission. Interim Guidance on the Grant Aiding and Planting of Eucalypts in Scotland. Accessed: 1 June 2012. 3. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. *Encyclopedia of Biological Invasions* . Berkeley: University of California Press.	1. It is likely that most Eucalypts are allelopathic-having the potential to suppress understory plants through chemical inhibitors that leach into the soil. 2. There are many reports in global literature of toxic inhibition of germination and growth of other plant species (allelopathic effects), which inhibits the growth of an understory. 3. Concerns expressed about suppression of ground vegetation due to possible allelopathic effects. Allelopathic effects are widely reported and these reports are largely based on laboratory bioassays. If not chemical inhibition then at least accumulation of dead material of the floor of eucalypt plantations hinders regeneration of native species.
4.03		No evidence.
4.04	1. United States Department of Agriculture Permit applications 08-11-106rm and 08-014-101rm received from ArborGen LLC. Field testing of genetically engineered *E. grandis* X *E. urophylla* (http://www.aphis.usda.gov/brs/aphisdocs/08_014101rm_ea2.pdf [Accessed: 8/19/2010]).	1. Eucalyptus species are known to produce chemical compounds that are required by the plant for defense against herbivores and pathogens.
4.05	1. *Medicinal Plants for Livestock: Eucalyptus spp* . Cornell University, Department of Animal Science. http://www.ansci.cornell.edu/plants/medicinal/eucalyp.html. 1 June 2012.	1. "*Eucalyptus spp.* contain high levels of phenolics and terpenoids which can be toxic. Animals such as the koala which eat Eucalyptus have developed methods for detoxifying the compounds in the liver. In addition, they have bacteria that degrade tannin-protein complexes. Most animals do not have this ability."
4.06		
4.07		
4.08	1. Gill, A.M. "Eucalypts and fires: interdependent or independent?" In: *Eucalypt ecology: individuals to ecosystems* . Ed. J.E. Williams & J. Woinarski. Cambridge, New York: Cambridge University Press, 1997. 2. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. *Encyclopedia of Biological Invasions.* Berkeley: University of California Press.	1. Eucalypts often are the major source of fuel for fires, but not always. 2. Leaves of eucalypts are relatively slow to breakdown and have a high volatile oil content, which contributes to the severity of fire events in their native Australia.

4.09	1. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. Encyclopedia of Biological Invasions. Berkeley: University of California Press.	1. Shade-tolerant sub-canopy [Eucalyptus] species are not known.
4.10	1. PROSEA."*Eucalyptus pellita* ". AgroForestryTree Database. www.worldagroforestry.org. Accessed 1 June 2012.	1. "The tree grows mainly on gentle to moderately sloping topography, although it is found, to a limited extent, on steep, well-drained slopes of large ridges and even alongside small streams in the drier and hotter parts of its occurrence. On bare rock above beaches, it may be reduced to a bushy shrub...Soil type: Well-drained soils ranging from shallow sands on sandstone ridges to shallow sandy podzols and deep forest loams."
4.11	1. PROSEA."*Eucalyptus pellita* ". AgroForestryTree Database. www.worldagroforestry.org. Accessed 1 June 2012.	1. "*Eucalyptus pellita* is a medium-size to large tree".
4.12	1.a-b. PROSEA."*Eucalyptus pellita* ". AgroForestryTree Database. www.worldagroforestry.org. Accessed 1 June 2012.	1.a. "In its natural habitat, *E. pellita* is found in open forest formation with a large number of other Eucalyptus species, in tall sclerophyll forest and at the margins of rainforests." 1.b. On bare rock above beaches, it may be reduced to a bushy shrub.
5.01	1. PROSEA."*Eucalyptus pellita* ". AgroForestryTree Database. www.worldagroforestry.org. Accessed 1 June 2012.	1." In its natural habitat, *E. pellita* is found in open forest formation with a large number of other Eucalyptus species, in tall sclerophyll forest and at the margins of rainforests."
5.02	1. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15948 [Accessed: 8 May 2012]).	1. Family: *Myrtaceae.*
5.03	1. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15948 [Accessed: 8 May 2012]).	1. Family: *Myrtaceae.*
5.04	1. PROSEA."*Eucalyptus pellita* ". AgroForestryTree Database. www.worldagroforestry.org. Accessed 1 June 2012.	1. "*Eucalyptus pellita* is a medium-size to large tree".
6.01		
6.02	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: CAB International, 2000. Forestry Compendium Global Module. Wallingford, UK: CAB International.	1. Propagation by seed is the easiest method.

6.03	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: CAB International, 2000. Forestry Compendium Global Module. Wallingford, UK: CAB International.	1. Review of interspecific hybrids in Eucalyptus, Griffin et al., (1988) note records of the following natural hybrids involving *E. pellita* and other species in the subgenus *Symphyomyrtus : E. pellita* x *E. resinifera, E. grandis* x *E. pellita* and *E. brassiana* x *E. pellita* . Natural hybrids between *E. pellita* and *E. brassiana* have been observed in Western Province, Papua New Guinea and Cape York, Queensland, where the two species co-occur (CSIRO Australian Tree Seed Centre, unpublished). Occasional hybrids with *E. brassiana* are also evident in *E. pellita* progeny trials testing PNG and Cape York provenances in northern Australia, Sabah and Java, Indonesia. They are distinguished from E. pellita by their dull grey-green coloured, longer, narrower, pendant leaves, and their narrower crowns and light grey, smooth bark. Some of these hybrids in progeny trials in northern Australia and Java, display good form and vigour, equalling that of the best pure *E. pellita* individuals. Figueredo Luz et al. (1996) note the occurrence of hybrids of *E. pellita* with *E. tereticornis* and *E. grandis* in Brazil, which grew better than the parent species on sandy soils.
6.04	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: CAB International, 2000. Forestry Compendium Global Module. Wallingford, UK: CAB International.	1. *E. pellita* is monoecious, and flowers are bisexual and protandrous. The species displays a mixed mating system. House and Bell (1996) obtained multi-locus estimates of population outcrossing rate, t, from isozyme studies of the progenies of ten-tree seed collections from each of three natural populations, as follows: Bupul-Muting in Irian Jaya (t = 0.49 ± 0.08), Lankelly Creek in Cape York, Queensland (t = 0.45 ± 0.06) and Kuranda, Queensland (t = 0.73 ± 0.05). This indicates that over 50% of the seeds from some natural provenances are produced by self-fertilisation or matings between very close relatives, and thus are inbred. The Bupul-Muting and Lankelly Creek outcrossing rates were considerably lower than published values for other eucalypt species (mean of t = 0.74 across 12 eucalypt species, Eldridge et al., 1993)
6.05	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: CAB International, 2000. Forestry Compendium Global Module. Wallingford, UK: CAB International.	1. Bees, other insects, and perhaps birds, which are attracted to the nectar of the flowers are the main pollinating agents
6.06		

6.07	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: CAB International, 2000. Forestry Compendium Global Module. Wallingford, UK: CAB International.	1. Planted trees commence flowering within 18-24 months, and given suitable climates and soils, most trees in a planted stand thinned to a wide spacing (200 stems/ha) flower and set seed within 4 years
7.01		
7.02	1. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.	Species is being considered for introduction as a biomass crop. 1. Wood used for flooring,cladding, panelling, sills and general construction purposes.
7.03		
7.04	1. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print. 2. Potts, B. 1990. The response of eucalypt populations to a changing environment. Tasforests, December: 179-193. 3. Cremer, K.W. 1977. Distance of seed dispersal in Eucalypts estimated from seed weights. Australian Forest Research, 7(4): 225-228. 4. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In: D. Simberloff & M. Rejmánek, eds. Encyclopedia of Biological Invasions. Berkeley: University of California Press.	No adaptions for wind dispersal (i.e., lacks wings). 1. Seeds pyramidal, brown, hilum terminal. 2. Seed dispersal in most eucalypt species is mainly by wind and gravity. 3. Wind is probably the only important agent of seed dispersal in the eucalypts, except possibly in species growing on river margins or flood plains where water could also transport the seed. 4. Relatively limited seed dispersal; planted eucalypts are very small and have no adaptions for dispersal (wings or fleshy). The passive release of seeds is undoubtedly aided by wind; however all rigorous studies of eucalypt seed dispersal and seedling spatial distribution show that in general seeds are dispersed over quite short distances that are in agreement with measurement of terminal descent velocity.
7.05	1. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. *Encyclopedia of Biological Invasions* . Berkeley: University of California Press.	1. Eucalypts should not be planted near rivers/streams. Temporarily flooded or eroded river/stream banks are suitable habitat for spontaneous establishment of seedlings. Additionally, their seeds can be dispersed for long distances by running water.
7.06	1. Southern, S.G. et al. 2004. Review of gene movement by bats and birds and its potential significance for eucalypt plantation forestry. *Australian Forestry* , 67(1): 44-53.	1. Dispersal in animal droppings does not occur, although many birds eat eucalypt seed, because the seed does not survive passage through the alimentary canal of mammals and birds (Joseph 1986).
7.07	1. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.	No adaptations that would suggest that it could attach itself externally to animals. 1. Seeds pyramidal, brown, hilum terminal.
7.08	1. Southern, S.G. et al. 2004. Review of gene movement by bats and birds and its potential significance for eucalypt plantation forestry. *Australian Forestry* , 67(1): 44-53.	1. Dispersal in animal droppings does not occur, although many birds eat eucalypt seed, because the seed does not survive passage through the alimentary canal of mammals and birds (Joseph 1986).
8.01		

8.02	1. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. *Encyclopedia of Biological Invasions* . Berkeley: University of California Press.	1. Eucalypt seeds do not have dormancy and seed storage in the soil lasts less than a year.
8.03	1. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). In D. Simberloff & M. Rejmánek, eds. *Encyclopedia of Biological Invasions* . Berkeley: University of California Press.	1. Triclopyr or glyphosate applied to freshly cut stumps can greatly reduce resprouting.
8.04	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: CAB International, 2000. Forestry Compendium Global Module. Wallingford, UK: CAB International.	1. Plantations should be protected from fire. The species has thick bark and established saplings can therefore survive ground fires of low intensity. In the natural forests, mature trees can recover from crown fires of moderate intensity, although these may cause fire-scars in the main stem. Also suited for coppicing.
8.05		