Eucalyptus benthamii (Camden White Gum) FLORIDA			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-	2	
	high)		
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	n	0
2.04	Native or naturalized in regions with an average of 11-60 inches of annual	У	1
	precipitation		
2.05	Does the species have a history of repeated introductions outside its natural	У	
2.24	range?		
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	У	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	?	-
4.03	Parasitic	n ?	0
4.04	Unpalatable to grazing animals  Toxic to animals	ŗ	
4.05 4.06			
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans  Creates a fire hazard in natural ecosystems		0
4.08	Is a shade tolerant plant at some stage of its life cycle	n	U
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils).	n	0
4.10	North & Central Zones: infertile soils; South Zone: shallow limerock or	n	U
	Histisols.		
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	n	0
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	n	0
6.02	Produces viable seed	У	1
6.03	Hybridizes naturally y		1
6.04			1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation		
6.07	Minimum generative time (years)	6	-1

Completed: July 2012

7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily		
	trafficked areas)		
7.02	Propagules dispersed intentionally by people	у	1
7.03	Propagules likely to disperse as a produce contaminant		-1
7.04	Propagules adapted to wind dispersal		-1
7.05	Propagules water dispersed	у	1
7.06	Propagules bird dispersed		-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		-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr) n -1		-1
8.03	Well controlled by herbicides		
8.04	Tolerates, or benefits from, mutilation or cultivation	у	1
8.05	Effective natural enemies present in U.S.		
	Total Score	-	1
	Implemented Pacific Second Screening	N	lo
	Risk Assessment Results	Acc	ept

Completed: July 2012

	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	No computer analysis was performed. 1. Global plant
	(http://www.nappfast.org/Plant_hardiness/NAPPFAST%20	hardiness zones (8?-)9-10; equivalent to USDA Hardiness
	Global%20zones/10-	zones (8?-)9-10. 2. Restricted distribution in coastal New
	year%20climate/PLANT_HARDINESS_10YR%20lgnd.tif) &	South Wales, south-west of Sydney on the flats of the
	USDA Plant Hardiness Zone Map, 2012. Agricultural	Nepean River and its tributaries between Wallacia and
	Research Service, U.S. Department of Agriculture. Accessed	Camden. Another larger population is on Kedumba Creek
	from http://planthardiness.ars.usda.gov. 2. Benson, D.H.	(about 5 km upstream from the junction with the old Coxs
	1985. Aspects of the ecology of a rare tree species,	River). 3.a. Occurring on the alluvial floodplains of the
	Eucalyptus benthamii , at Bents Basin, Wallacia.	Nepean River and its tributaries, south-west of Sydney,
	Cunninghamia 1(3): 371-383. 3.a-b. Butcher, P.A. et al.	Australia. 3.b. Species is now confined to one population of
	2005. Increased inbreeding and inter-species gene flow in	approximately 6500 trees in the Kedumba valley and three
	remnanat populations of the rare Eucalyptus benthamii .	remnant populations on the Nepean River at Bents Basin
	Conservation Genetics 6: 213-226. 4. Clara, Victoria Higa	(about 300 trees), Wallacia (nine trees), and Camden (about
	Rosana. 1999. Ecological and Forestry of Eucalyptus	30 trees). 4. <i>E. benthamii</i> is found in limited areas, west of
	benthamii Maiden camber ET. Bulletin of Forestry	Sydney plains along the Nepean River and its tributaries. 5.
	Research, Colombo No. 38: 121-123. 5. Threatened Species	The habitat of <i>E. benthamii</i> is restricted to the alluvial flats
	Unit, Central Directorate, New South Wales National Parks	of the Kedumba/Cox/Nepean river system at an altitude of
	and Wildlife Service. Environmental Impact Assessment	140-750m.
	Guidelines. Eucalyptus benthamii Maiden and Cambage.	
	May 2000. On-line.	
	http://www.environment.nsw.gov.au/resources/nature/Eb	
	enthamiiEia0500.pdf. Accessed: 28 June 2011.	

2.01	6. Threatened Species Unit, Central Directorate, New	6. E. benthamii is restricted but locally abundant. It is
cont	South Wales National Parks and Wildlife Service.	known from two main locations, Bents Basinand the
	Threatened Species Information. Eucalyptus benthamii	Kedumba Valley. A few scattered individuals are recorded
	Maiden and Cambage. May 2000. On-line.	from other sites on the sandy alluvial flats fo the
	http://www.environment.nsw.gov.au/resources/nature/TS	Kedumba/Cox/Nepean River system. 7. Possible
	profileEucalyptusBenthamii.pdf. Accessed: 28 June 2011.	alternatives of Eucalypts, including Eucalyptus benthamii,
	7. Little, K.M & Gardner, A.W. 2003. Coppicing ability of 20	were planted in South Africa (Broadholms in Mpumalanga
		province and Draycott in KwaZulu-Natal province) between
	Africa. Canadian Journal of Forest Research 33: 181-189. 8.	1990-1991. 8. Cultivation large-diameter eucalypts is a new
	Turnbull, J.W., ed., 2003. Eucalypts in Asia. Proceedings of	trend in China and elsewhere. The main species being
	an International Conference held in Zhanjiang, Guangdong,	tested include E. benthamii,etc. in Fujian, Guangdong,
	People's Republic of China, 7–11 April 2003. ACIAR	Guangxi, Hainan, Hunan and Yunnan. 9. Has displayed an
	Proceedings No. 111, 267 p. 9. FAO, FLD, IPGRI. 2004.	ability to grow on diverse sites, including those subject to
	Forest genetic resources conservation and management.	frost and drought stress.
	Vol. 1: Overview, concepts and some systematic	
	approaches. International Plant Genetic Resources Institute,	
	Rome, Italy.	
	nome, really.	
2.02		No computer analysis was performed. Native range is well
		known; refer to 2.01 source data.
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-	1. Native distribution in Wallacia and Camden appears to be
	syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf).	in 1 climatic group (Cfa); Cultivated distribution in South
	, , , , , , , , , , , , , , , , , , , ,	Africa appears in 1-2 climatic groups (Cfa or Cfb [not both,
		difficult to determine printout]) and Cwa or Cwb [not both,
		difficult to determine on printout]); Cultivated trial
		distribution in China appears in 2 climatic groups (Cfa and
		Cwa).
2.04	1. Commonwealth of Australia 2011, Bureau of	1. Mean annual precipitation in the native southwest of
	Meteorology.	New South Wales is 1200-2000 mm (47.2"-78.7"). 2.
	http://www.bom.gov.au/climate/averages/maps.shtml.	Rainfall year is 1100 mm (43") with peaks in summer and
	Accessed: 3 April 2012. 2. Clara, Victoria Higa Rosana.	mild autumn.
	1999. Ecological and Forestry of Eucalyptus benthamii	
	Maiden camber ET. Bulletin of Forestry Research, Colombo	
	No. 38: 121-123.	
2.05	1. Butcher, P.A. et al. 2005. Increased inbreeding and inter-	1. Eucalyptus benthamii is a forest tree of interest for
	species gene flow in remnanat populations of the rare	plantation forestry. 2. In the 1980s, six site x species
	Eucalyptus benthamii . Conservation Genetics 6: 213-226.	interaction trials were planted in 1990-1991, including <i>E</i> .
	2. Little, K.M & Gardner, A.W. 2003. Coppicing ability of 20	benthamii . 3. Cultivation large-diameter eucalypts is a new
	Eucalyptus species grown at two high-altitude sites in	trend in China and elsewhere. The main species being
	South Africa. Canadian Journal of Forest Research 33: 181-	tested include <i>E. benthamii</i> ,etc. in Fujian, Guangdong,
	189. 3. Turnbull, J.W., ed., 2003. Eucalypts in Asia.	Guangxi, Hainan, Hunan and Yunnan.
	Proceedings of an International Conference held in	
	Zhanjiang, Guangdong, People's Republic of China , 7–11	
	April 2003. ACIAR Proceedings No. 111, 267 p.	

3.01	1. Benson, D.H. 1985. Aspects of the ecology of a rare tree species, <i>Eucalyptus benthamii</i> , at Bents Basin, Wallacia. <i>Cunninghamia</i> 1(3): 371-383.	1. Restricted distribution in coastal New South Wales, southwest of Sydney on the flats of the Nepean River and its tributaries between Wallacia and Camden. Another larger population is on Kedumba Creek (about 5 km upstream from the junction with the old Coxs River).
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): <i>E. cambageana, E. ferruginea, E. gracilis, E. marginata, E. miniata, E. pilularis, E. populnea, E. tetradonta</i> .
4.01	1. Brooker, M.I.H et al. "Eucalypts of Southern Australia." <u>EUCLID Second Edition</u> . CSIRO. 2002. Australia. 30 June 2011. 2. Threatened Species Unit, Central Directorate, New South Wales National Parks and Wildlife Service. Threatened Species Information. <i>Eucalyptus benthamii</i> Maiden and Cambage. May 2000. On-line. http://www.environment.nsw.gov.au/resources/nature/TS profileEucalyptusBenthamii.pdf. Accessed: 28 June 2011.	1. Bark is smooth throughout or with a partially adherent brownish rough bark at the base of the trunk and smooth bluish-gray or white bark further up the trunk. 2. <i>E. benthamii</i> has smooth white bark with long hanging bark ribbons and a persistent flaky bark stocking at the base.
4.02	1. May, F.E. & J.E. Ash. 1990. An Assessment of the Allelopathic Potential of <i>Eucalyptus</i> . <i>Australian Journal of Botany</i> 38: 245-254.	1. Previous studies have shown that various <i>Eucalyptus</i> species can yield allelopathic chemicals which may be effective in suppressing understorey vegetation. However, the techniques employed in many studies do not resemble natural ecological processes.
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 <i>E. grandis X E. urophylla</i> (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		
4.06		
4.07		

6.01	2011.	
5.04	1. Brooker, M.I.H et al. "Eucalypts of Southern Australia." <u>EUCLID Second Edition</u> . CSIRO. 2002. Australia. 30 June 2011.	1. Tree, medium-sized to 40 m tall.
	1. The Royal Botanic Gardens and Domain Trust (2 April 2012). PlantNET - The Plant Information Network System of The Royal Botanic Gardens and Domain Trust, Sydney, Australia (version 2.0). http://plantnet.rbgsyd.nsw.gov.au	1. Family: Myrtaceae .
5.02	1. The Royal Botanic Gardens and Domain Trust (2 April 2012). PlantNET - The Plant Information Network System of The Royal Botanic Gardens and Domain Trust, Sydney, Australia (version 2.0). http://plantnet.rbgsyd.nsw.gov.au	1. Family: Myrtaceae .
5.01	1. Brooker, M.I.H et al. "Eucalypts of Southern Australia." <u>EUCLID Second Edition</u> . CSIRO. 2002. Australia. 30 June 2011.	1. Occurs in wet open forests.
4.12	1. Brooker, M.I.H et al. "Eucalypts of Southern Australia." <u>EUCLID Second Edition</u> . CSIRO. 2002. Australia. 30 June 2011.	1. Medium-sized to tall, rare tree occurring in few stands.
4.11	1. Brooker, M.I.H et al. "Eucalypts of Southern Australia." <u>EUCLID Second Edition</u> . CSIRO. 2002. Australia. 30 June 2011.	1. Tree to 40 m tall.
4.10	Wales National Parks and Wildlife Service. Threatened Species Information. <i>Eucalyptus benthamii</i> Maiden and Cambage. May 2000. On-line. http://www.environment.nsw.gov.au/resources/nature/TS profileEucalyptusBenthamii.pdf. Accessed: 28 June 2011. 2. Benson, D.H. 1985. Aspects of the ecology of a rare tree species, <i>Eucalyptus benthamii</i> , at Bents Basin, Wallacia. <i>Cunninghamia</i> 1(3): 371-383.	1. E. benthamii occurs only in wet open forest on sandy alluvial soils. The soils are shallow to moderately deep, < 100 cm, and are well-drained alluvial sands and gravels along stream channels, small terraces and alluvial flats. 2. The species is confined to the fertile riverflats and alluvial banks of the Nepean River and its tributaries.
	1. Threatened Species Unit, Central Directorate, New South Wales National Parks and Wildlife Service. Threatened Species Information. <i>Eucalyptus benthamii</i> Maiden and Cambage. May 2000. On-line. http://www.environment.nsw.gov.au/resources/nature/TS profileEucalyptusBenthamii.pdf. Accessed: 28 June 2011.	1. E. benthamii responds to low-intensity fire damage by producing epicormic shoots on the branches and trunk. After severe fire damage trees may be weakened at the base, collapse, and regrow coppice stems. Intense fire even large trees my be killed outright.

6.02	1. Threatened Species Unit, Central Directorate, New South Wales National Parks and Wildlife Service. Threatened Species Information. <i>Eucalyptus benthamii</i> Maiden and Cambage. May 2000. On-line. http://www.environment.nsw.gov.au/resources/nature/TS profileEucalyptusBenthamii.pdf. Accessed: 28 June 2011. 2.	Germination seems to be triggered by flood events where the accompanying silt deposition provides suitable conditions for germination.     Preshly collected seed has good viability.
	Benson, D.H. 1985. Aspects of the ecology of a rare tree species, <i>Eucalyptus benthamii</i> , at Bents Basin, Wallacia. <i>Cunninghamia</i> 1(3): 371-383.	
6.03	1. Benson, D.H. 1985. Aspects of the ecology of a rare tree species, <i>Eucalyptus benthamii</i> , at Bents Basin, Wallacia. <i>Cunninghamia</i> 1(3): 371-383.	1. Hybridization with <i>E. viminalis</i> occurs naturally in the Camden region and readily hybridizes with eucalypts that are in the same taxonomic section of the genus.
6.04	1. Benson, D.H. 1985. Aspects of the ecology of a rare tree species, <i>Eucalyptus benthamii</i> , at Bents Basin, Wallacia. <i>Cunninghamia</i> 1(3): 371-383.	1. Most inbreeding appears to be from selfing rather than biparental inbreeding. Estimates of correlated selfing among loci with highly significant in all populations with about 80% of inbreeding due to selfing in the smallest population at Wallacia.
6.05	1. Benson, D.H. 1985. Aspects of the ecology of a rare tree species, <i>Eucalyptus benthamii</i> , at Bents Basin, Wallacia. <i>Cunninghamia</i> 1(3): 371-383.	General statement for species but accurate for most eucalypts. 1. Most eucalypts are insect-pollinated.
6.06		
6.07	1. Benson, D.H. 1985. Aspects of the ecology of a rare tree species, <i>Eucalyptus benthamii</i> , at Bents Basin, Wallacia. <i>Cunninghamia</i> 1(3): 371-383.	1. Under natural conditions, young trees 5m high, and probably only between 6 to 10 years old, may produce mature seed capsules.
7.01		
7.02	1. Benson, D.H. 1985. Aspects of the ecology of a rare tree species, <i>Eucalyptus benthamii</i> , at Bents Basin, Wallacia. <i>Cunninghamia</i> 1(3): 371-383.	1. Interest in the species for plantation forestry.
7.03		No evidence.

1. Brooker, M.I.H et al. "Eucalypts of Southern Australia." 1. No adaptions for wind dispersal (i.e., lacks wings). Seeds EUCLID Second Edition. CSIRO. 2002. Australia. 30 June are dark brown, 1-1.8 mm long, ovid or flattened-ovoid, 2011. 2. Potts, B. 1990. The response of eucalypt scarcely lacunose, dorsal surface smooth or shallowly populations to a changing environment. Tasforests, pitted, hilum ventral. 2. Seed dispersal in most eucalypt December: 179-193. 3. Cremer, K.W. 1977. Distance of species is mainly by wind and gravity. 3. Wind is probably the only important agent of seed dispersal in the eucalypts, seed dispersal in Eucalypts estimated from seed weights. Australian Forest Research, 7(4): 225-228. 4. Rejmánek, M. except possibly in species growing on river margins or flood & D.M. Richardson. 2011. Eucalypts (203-209). In: D. plains where water could also transport the seed. 4. Simberloff & M. Rejmánek, eds. Encyclopedia of Biological Relatively limited seed dispersal; planted eucalypts are very Invasions. Berkeley: University of California Press. 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. Howell, J. & D. Benson. 2000. Predicting potential 1. Eucalyptus benthamii Camden White Gum, was impacts of environmental flows on weedy riparian established in a previously grazed pasture near Bents Basin vegetation of the Hawkesbury-Nepean River, south-eastern after the 1964 flood, where it presumably benefited from Australia. Austral Ecology 25: 463-475. 2. Rejmánek, M. & the silt deposits left by the flood and the temporary D.M. Richardson. 2011. Eucalypts (203-209). In: D. absence of competition from grasses and weeds (Benson Simberloff & M. Rejmánek, eds. Encyclopedia of Biological 1985). Similar mechanisms apply to species of Callistemon, Invasions. Berkeley: University of California Press. 3. Leptospermum and Tristaniopsis, riparian small trees and Cremer, K.W. 1977. Distance of seed dispersal in Eucalypts shrubs which, like eucalypts, store small seed in woody estimated from seed weights. Australian Forest Research, capsules. 2. Eucalypts should not be planted near 7(4): 225-228. 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. 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. 7.06 1. Southern, S.G. et al. 2004. Review of gene movement by 1. Dispersal in animal droppings does not occur, although many birds eat eucalypt seed, because the seed does not bats and birds and its potential significance for eucalypt plantation forestry. Australian Forestry, 67(1): 44-53. survive passage through the alimentary canal of mammals and birds (Joseph 1986). 7.07 1. No evidence of features for attachment.

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. <i>Australian Forestry</i> , 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	2. FAO, FLD, IPGRI. 2004. Forest genetic resources conservation and management. <i>Vol. 1: Overview, concepts and some systematic approaches. International Plant Genetic Resources Institute</i> , Rome, Italy.	1. The long-term viability of these stands is threatened by lack of regeneration associated with poor and erratic seed production.
8.02	1. Rejmánek, M. & D.M. Richardson. 2011. Eucalypts (203-209). <i>In</i> : D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i> . 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). <i>In</i> : D. Simberloff & M. Rejmánek, eds. <i>Encyclopedia of Biological Invasions</i> . Berkeley: University of California Press.	1. Triclopyr or glyphosate applied to freshly cut stumps can greatly reduce resprouting.
8.04	1.a-b. Threatened Species Unit, Central Directorate, New South Wales National Parks and Wildlife Service. Threatened Species Information. <i>Eucalyptus benthamii</i> Maiden and Cambage. May 2000. On-line. http://www.environment.nsw.gov.au/resources/nature/TS profileEucalyptusBenthamii.pdf. Accessed: 28 June 2011.	1.a. Responds to low-intensity fire damage by producing epicormic shoots on the branches and trunk. 1.b. After severe fire damage trees may be weakened at the base, collapse, and regrow coppice stems which may survive for another 100 years.
8.05		