Eucalyptus sideroxylon (Black Ironbark, Mugga Ironbark, Red Ironbark, Three-Fruit Red Ironbark) -- 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	n	0
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture		
3.04	Environmental weed		
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	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		
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	?	
6.04	Self-compatible or apomictic		
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation		
6.07	Minimum generative time (years)		

Completed: July 2012

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	**6**	
	Implemented Pacific Second Screening	**Yes**	
	Risk Assessment Results	**Accept**	

	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: 19 March 2012]). 3. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print. 4. "*Eucalyptus sideroxylon* ." horticopia.com. Horticopia, 2011. Web. 29 May 2012.	**No computer analysis was performed**. 1. Global plant hardiness zones 8-10; equivalent to USDA Hardiness zones 8a-10a (north, central, south zones of Florida). 2. Native distribution: New South Wales, southeast Queensland, and Victoria Australia. 3. Extends from Wangaratta in north Victoria through the western slopes of New South Wales extending to the western plains, with some more easterly occurrences near Sydney and the Hunter Valley to southeastern Queensland. 4. Hardy range 10a-11.
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 (BSh, BSk, Cfa, Cfb, possibly Csb). 2. Altitudinal sea lever to 1000 m (3280.8').
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. 200 mm-1200 mm (7.9"- 47.2"). 2. 450 mm-1000 mm (17.7"-39.4").
2.05	1. USDA, NRCS. 2012. The PLANTS Database (http://plants.usda.gov, 2 July 2012). National Plant Data Team, Greensboro, NC 27401-4901 USA. Accessed: 29 May 2012. 2. Hawaiian Ecosystems at Risk project (HEAR), The Global Compendium of Weeds. http://www.hear.org/gcw/. Accessed 29 May 2012. 3. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15948 [Accessed: 19 March 2012]).	1. Present in California and Hawaii. 2. South Africa, Ecuador, Hawaii, New Zealand. 3. Cultivated in Australia.

3.01	1. Howell, C. et al. 2006. *New Zealand Naturalised Vascular Plant Checklist.* New Zealand Plant Conservation Network. 2. Wagner, W. L. et al. *Manual of the Flowering Plants of Hawai'i* . Vol. 1. Honolulu, HI: Bishop Museum Press, 1990. Print. 3. Pacific Island Ecosystems at Risk (PIER). Global Compendium of Weeds. http://www.hear.org. Accessed 29 May 2012.	1. *E. sideroxylon* is casually naturalised in New Zealand. 2. "In Hawai'I planted on Kaua'i, O'ahu, Moloka'i, and Maui, and regenerating both within and near plantations." 3. Naturalized in Ecuador.
3.02	1. Henderson, L. *Alien Weeds and Invasive Plants* . Cape Town, South Africa: Agricultural Research Council, 2001. Print.	1. "Invades: Watercourses. Origin: SE Australia. Invasive status: Potential transformer. Declared Invader".
3.03		
3.04		
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. 2. "*Eucalyptus sideroxylon". Horticopia.com.* Horticopia, 2011. Web. 29 May 2012.	1. Shade-tolerant sub-canopy [Eucalyptus] species are not known. 2. "Partial shade or partial sun to full sun."
4.10	1. "*Eucalyptus sideroxylon". Horticopia.com* . Horticopia, 2011. Web. 29 May 2012. 2. Boland, D.J. et al. *Forest Trees of Australia.* 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.	1. "Suitable soil is well-drained/loamy, sandy or clay. The pH preference is an acidic to alkaline (less than 6.8 to more than 7.7) soil". 2. Typically found on poor, shallow soils, including sands, gravel, ironstones, and clays.
4.11	1. Henderson, L. *Alien Weeds and Invasive Plants.* Cape Town, South Africa: Agricultural Research Council, 2001. Print.	1. "Evergreen tree 15-26 m high with a moderately spreading crown".
4.12	1. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.	1. Small to medium-sized tree, trunk is often poor while the bole done not usually exceed half of the tree.
5.01	1. Boland, D.J. et al. *Forest Trees of Australia* . 5th ed. Collingswood, Victoria, Australia: CSIRO, 2006. Print.	1. Occur mainly on the hilly countryside, in woodland and open forests.
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. Henderson, L. *Alien Weeds and Invasive Plants.* Cape Town, South Africa: Agricultural Research Council, 2001. Print.	1. "Evergreen tree 15-26 m high with a moderately spreading crown".
6.01		
6.02	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: http://farrer.csu.edu.au/ASGAP/e-sider.html. 2. FloraBank. Accessed 29 May 2012. http://florabase.calm.wa.gov.au.	1. Propagation is from seed which germinates readily. 2. There are about 240 viable seeds per gram; seeds start to germinate in about 5 days if grown at 20°C with no pretreatment required.
6.03	1. Discover Life. www.discoverlife.org/ Via: Integrated Botanical Information System (IBIS), Australian National Botanic Gardens, Australian National Herbarium. Accessed 29 May 2012.	1. A reputed hybrid *E. sideroxylon* x *E. microcarpa* is the basis for *E. barmedmanensis* (Pryor & Johnson, 1971; Chippendale, 1988). A reputed hybrid of parentage *E. odorata* x *E. sideroxylon* (Maiden. 1906) or *E. viridis* x *E. sideroxylon* (Pryor & Johnson, 1971) is the basis for *E. blackburniana* Maiden. A reputed hybrid *E. intertexta* x *E. sideroxylon* is the basis for *E. ednaeana* Blakely (Pryor & Johnson, 1971; Chippendale, 1988). A reputed hybrid *E. melliodora* x *E. sideroxylon* is the basis of *E. stopfordii* Maiden (Maiden, 1922; Chippendale, 1988). APC Dist.: SA (sparingly naturalised), Qld, NSW, Vic.
6.04		
6.05	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org. Via: http://www.ibiblio.org/pfaf/cgi-bin/arr_html?Eucalyptus+sideroxylon. 2. FloraBank. Accessed 29 May 2012. http://florabase.calm.wa.gov.au.	1. Flowers are hermaphrodite (have both male and female organs) and are pollinated by bees. 2. Flowers are especially attractive to birds.
6.06		
6.07		
7.01		
7.02	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: 19 March 2012]). 2. 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. Economic importance: bee plants (honey production), environmental (ornamental), materials (wood). 2. Used for heavy engineering construction and for railway sleepers.
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 ovoid or compressed-ovid, brown or grey, hilum ventral. 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. 2. Little, Jr., E.L. *Common Fuelwood Crops* . Morgantown, WV: Communit-Tech Associates, 1983. Print. 3. USDA Forest Service, Northeastern Area. http://www.na.fs.fed.us/pubs/silvics_manual/volume_2/eucalyptus/saligna.htm. Accessed 29 May 2012.	No adaptations that would suggest that it could attach itself externally to animals. 1. Seeds ovoid or compressed-ovid, brown or grey, hilum ventral.
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. 2. FloraBank. Accessed 29 May 2012. http://florabase.calm.wa.gov.au.	1. Tolerates fire, ability to coppice. 2. Regenerates foliage after damaging fire.
8.05		