Dichrostachys cinerea (Marabou, Marabou-thorn, Sickle bush)		**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 with mean annual precipitation of 40-70 inches.	y	1
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	y	4
3.04	Environmental weed	y	4
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	y	1
4.02	Allelopathic	n	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	n	-1
4.05	Toxic to animals	n	0
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans.	n	0
4.08	Creates a fire hazard in natural ecosystems	n	0
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).	y	1
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	y	1
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	n	0
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	y	1
6.07	Minimum generative time (years)		
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	n	-1
7.04	Propagules adapted to wind dispersal	y	1

7.05	Propagules water dispersed	y	1
7.06	Propagules bird dispersed	n	-1
7.07	Propagules dispersed by other animals (externally)	y	1
7.08	Propagules dispersed by other animals (internally)	y	1
8.01	Prolific seed production	y	1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	y	1
8.03	Well controlled by herbicides	y	-1
8.04	Tolerates, or benefits from, mutilation or cultivation	y	1
8.05	Effective natural enemies present in Florida, or east of the continental divide.	?	
	Total Score	**27**	
	Implemented Pacific Second Screening	**No**	
	Risk Assessment Results	**Reject**	

	Reference	Source data
1.01	1. CAB International, 2010. *Dichrostachys cinerea* [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	Cultivated, but no evidence of selection for reduced weediness. 1. No breeding has been undertaken, even for ornamental, less invasive varieties.
1.02		
1.03		
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). 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15924. 3. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	**No computer analysis was performed**. 1. Global hardiness zones: 9-13. 2. Africa (Macronesia, NE Tropical, East Tropical, West-Central, West Tropical, South Tropical, Southern); Asia-Temperate, Asia Tropical; Australia (Northern Territory). 3. Native range: Africa to India, Southern Thailand and Malesia, Northern Territories of Australia.
2.02		**No computer analysis was performed**.
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?15924. 3. Cowling, R.M, D.M. Richardson, & S.M. Pierce. *Vegetation of Southern Africa* . United Kingdom: Cambridge University Press. 1997. Print. 4. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	1. Distribution in the native range is widespread and occurs in more than 3 climatic groups. 2. Africa (Macronesia, NE Tropical, East Tropical, West-Central, West Tropical, South Tropical, Southern); Asia-Temperate, Asia Tropical; Australia (NT). 3. *D.cinerea* is a common pioneer tree species in arid areas. 4. Native range: Africa to India, Southern Thailand and Malesia, Northern Territories of Australia.
2.04	1. Globalis (http://globalis.gvu.unu.edu/).	1. Cuba: 24"-80"; Africa: 4"-118"; Asia: 40"-118").
2.05	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011]. 2. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm. 3. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1. It has been introduced to the West Indies during the 19th century - mainly to Cuba, Hispaniiola, Guadeloupe, Marie-Galante, and Martinique. 2. Introduced and/or invasive in La Réunion Island (France) and Mauritius Islands. 3. *D. cinerea* has been widely introduced around the world, mainly as an ornamental or for erosion control.
3.01	1. Kairo, M. et al. 2003. *Report to the Nature Conservancy: Invasive Species Threats in the Caribbean Region* . CAB International	1. Naturalized and invasive in Cuba.

3.02	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011].	1. Invades fields, wasteland, roadsides, urban areas, and other ruderal/disturbed areas.
3.03	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011]. 2. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	1. Occurs in planted forests and agricultural areas, causing losses in agricultural production; management involves frequent, heavy and expensive work. 2. 'Whole farms in central Cuba have been rendered uselsee by this foreign nuisance without any effort being made to check the curse and that good farm land is being abandoned in disgust'.
3.04	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011].	1. Occurs in natural forests, range/grasslands, riparian zones, and scrub/shrublands.
3.05	1.a-b. Holm et al. *A Geographical Atlas of World Weeds* . New York: John Wiley & Sons. 1979. Print.	1.a. *Dichrostachys glometata* (Forsk.) Chiov. is a serious weed in South Africa; a principal weed in Cuba; a common weed in Kenya and Rhodesia (now known as The Republic of Zimbabwe); and present as a weed in Angola. 1.b. *Dichrostachys nutans* Benth. is present as a weed in the United States.
4.01	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	1. Forms thickets quite impenetrable on account fo the density and the abundance of long, stiff, sharp thorns.
4.02		
4.03		
4.04	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm. 2. FAO - Food and Agriculture Organizaton of the UN. View Crop Ecocrop Data Sheet. Available at: http://ecocrop.fao.org/ecocrop/srv/en/cropView?id=5302. Accessed: 1/21/2011. 3. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1. Cattle greatly relish the seeds. 2. Leaves and fruits can be used as feed. 3. The pods of *D. cinerea* are eaten by a number of animals including cattle, camels and game (World Agroforestry Centre, 2004). In South Africa, animals that feed on the pods include giraffe, buffalo, kudu, impala and Nyala (Cooke, 1998).
4.05	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm. 2. FAO - Food and Agriculture Organizaton of the UN. View Crop Ecocrop Data Sheet. Available at: http://ecocrop.fao.org/ecocrop/srv/en/cropView?id=5302. Accessed: 1/21/2011. 3. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1. Cattle greatly relish the seeds. 2. Leaves and fruits can be used as feed. 3. The pods of *D. cinerea* are eaten by a number of animals including cattle, camels and game (World Agroforestry Centre, 2004). In South Africa, animals that feed on the pods include giraffe, buffalo, kudu, impala and Nyala (Cooke, 1998).

4.06	1. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1. Pests recorded: *Ctenoplusia albostriata, Kerria lacca* (lac insect), *Megalurothrips sjostedti* (bean flower thrips), *Uredo deformis* .
4.07	1. FAO - Food and Agriculture Organizaton of the UN. View Crop Ecocrop Data Sheet. Available at: http://ecocrop.fao.org/ecocrop/srv/en/cropView?id=5302. Accessed: 1/21/2011.	1. Fruit and seeds are edible; the flowers area valuable honey source.
4.08	1. FAO - Food and Agriculture Organizaton of the UN. View Crop Ecocrop Data Sheet. Available at: http://ecocrop.fao.org/ecocrop/srv/en/cropView?id=5302. Accessed: 1/21/2011.	1. It is fire resistant.
4.09		
4.10	1.a-c. FAO - Food and Agriculture Organizaton of the UN. View Crop Ecocrop Data Sheet. Available at: http://ecocrop.fao.org/ecocrop/srv/en/cropView?id=5302. Accessed: 1/21/2011. 2. Cowling, R.M, D.M. Richardson, & S.M. Pierce. *Vegetation of Southern Africa* . United Kingdom: Cambridge University Press. 1997. Print. 3. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1.a. Tolereance is less on poor soils. Best growth occurs on deep, sandy loamy soils and it can tolerate a wide pH range. 1.b. In Malasia, it occurs usually on poor, occasionally clayey soils. 1.c. Forms dense thickets on lateritic soils in Senegal and Sudan. 2. *D.cinerea* is a common pioneer tree species in arid areas. 3. Soil Texture: heavy, light, medium; Soil Reaction: acid, neutral; Soil Drainage: free, seasonally waterlogged; Special Soil Tolerance: infertile, saline.
4.11		
4.12	1.a-c. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	1.a. In Cuba, forms dense, impenetrable thickets. 1.b. In the early stages of the formation of these forest the tree forms thickets quite impenetrable on account of the density and the abundance of long, stiff, sharp thorns. 1.c. With increasing size of the trees it is possible to walk over the area without much difficulty.
5.01		1. Family: Fabaceae
5.02		1. Family: Fabaceae
5.03	1. FAO - Food and Agriculture Organizaton of the UN. View Crop Ecocrop Data Sheet. Available at: http://ecocrop.fao.org/ecocrop/srv/en/cropView?id=5302. Accessed: 1/21/2011.	1. The roots fix atmospheric nitrogen and the leaves, rich in nutrients, are frequently used as a green manure.
5.04		
6.01		
6.02	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011]. 2. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	1. Reproduces by seed. 2. Tree spreads by means of the seeds.
6.03		
6.04		

6.05	1. Davison, E. *Aridus: Bulletin of The Desert Legume Program of The Boyce Thompson Southwestern Arboretum and The University of Arizona* . Unique Legumes on the University of Arizona Campus. 17(3): November 2005.	1. Flowers are bat-pollinated in native situations, but may be insect-pollinated on the UA campus. Bees have been observed on the flowers.
6.06	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011]. 2.a-b. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	1. Reproduces by root cuttings and root suckering. 2.a. Tree spreads by means of the advancing horizontal root system. 2.b. If the parent tree is cut down, lateral or horizontal roots at once sprout profusely. If their removal is attempted, any small section left in the soil immediately develops fiberous roots and produces shoots.
6.07	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011].	1. The growth of the plants is very fast. Young plants may produce seeds.
7.01		This may be possible if an agriculture field has occurances of *D. cinerea* ; seeds could potentially become lodged into the tread of agricultural machinery and transported from one field to another.
7.02	1.a-b. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1.a. Has been widely introduced around the world, mainly as an ornamental or for erosion control. 1.b. Highly likely to be transported internationally deliberately.
7.03		No evidence.
7.04	1. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1. Seeds may be dispersed by wind
7.05	1. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1. Seeds may be dispersed by water
7.06		No evidence.
7.07	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	1. The distribution of the tree is probably effected in part by cattle carrying seeds in the hoofs when driven or transported over the island.
7.08	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm.	1. Cattle greatly relish the seeds, and it is possible that they are capable of germinaton after passing through the animal.
8.01	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011].	1. Each plant produces a large number of seeds per year, almost all year long.
8.02	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011].	1. Seeds survive for a long time in the soil, almost all year long.

8.03	1. Global Invasive Species Database, 2005. Available from: http://www.issg.org/database/species/ecology.asp?si=19&fr=1&sts=sss [Accessed 2/16/2011]. 2. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc. 3. Almeida, F.S. de. 1974. Bush control in grassland by aerial spraying. *Proceedings of the Grassland Society of Southern Africa* . 9: 73-76.	1. Use of dangerous herbicides is often necessary. 2. Mechanical and chemical control are currently the most efficient control measures. 3. The results of 3 trials in which herbicides were applied aerially to control bush on severely-infested natural grassland in Mozambique, are reported. *Dichrostachys cinerea* were killed by a mixture of 2,4-D and 2,4,5-T at 1.8 kg/ha, by 2,4,5-T alone at 1.8 kg/ha and by Silvex (fenoprop) at 0.5 kg/ha. Picloram was effective against *D. cinerea* but was too expensive for use on beef production farms.
8.04	1. Pacific Island Ecosystems at Risk (PIER). http://www.hear.org/pier/wra/pacific/dichrostachys_cinerea_htmlwra.htm. 2.a-b. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1. If the parent tree is cut down, lateral or horizontal roots at once sprout profusely. If their removal is attempted, any small section left inthe soil immediately develops fiberous roots and produces shoots. 2.a. Tolerates, or benefits from, cultivation, browsing pressure, mutilation, fire, etc. 2.b. Coppices well. It has prolific root suckers and can regenerate from very small root cuttings. It can rpoduce 130 new stems from root suckers within a 15 m radius from the main trunk over 10 years (World Agroforestry Centre, 2005).
8.05	1.a-b. CAB International, 2010. Dichrostachys cinerea [Author unknown]. In: Forestry Compendium. Wallingford , UK: CAB International. www.cabi.org/fc.	1. A rust fungus, *Uredo deformis* has been identified in Sri Lanka as a potential biocontrol agent (Evans, 1999). 1.b. Other known natural enemies are the insects *Ctenoplusia albostriata* and *Kerria lacca* . **NOTE: These species are not known to occur in Florida or in the U.S; however there may be other effective natural enemies that are not known.