Australia/New Zealand Weed Risk Assessment adapted for Florida.

Data used for analysis published in: Gordon, D.R., D.A. Onderdonk, A.M. Fox, R.K. Stocker, and C. Gantz. 2008. Predicting Invasive Plants in Florida using the Australian Weed Risk Assessment. Invasive Plant Science and Management 1: 178-195.

Dioscorea bulbifera (air potato)			
Question number	**Question**	**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 Florida's USDA climate 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 habitats with periodic inundation	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	0
3.02	Garden/amenity/disturbance weed	n	0
3.03	Weed of agriculture	y	0
3.04	Environmental weed	n	0
3.05	Congeneric weed	y	0
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	n	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals		
4.05	Toxic to animals	y?	1
4.06	Host for recognised pests and pathogens	y?	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
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	y?	1
4.1	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils)	n	0
4.11	Climbing or smothering growth habit	y	1
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0

5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	y	1
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	n	-1
6.05	Requires specialist pollinators	n?	0
6.06	Reproduction by vegetative fragmentation	y	1
6.07	Minimum generative time (years)	1	1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y	1
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)	n	-1
7.08	Propagules dispersed by other animals (internally)	n	-1
8.01	Prolific seed production	y	1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)		
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			19

Outcome	**Reject***

*Used secondary screen from: Daehler, C. C., J.L. Denslow, S. Ansari, and H. Kuo. 2004. A risk assessment system for screening out harmful invasive pest plants from Hawaii's and other Pacific islands. Conserv. Biol. 18: 360-368.

section	# questions answered	satisfy minimum?
A	8	yes
B	11	yes
C	20	yes
total	39	yes

Data collected 2006-2007

Question number	Reference	Source data
1.01		highly cultivated, but breeding has likely made it more, not less, weedy
1.02		
1.03		
2.01	Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C.	"Probably *D. bulbifera* can be found in every hot, humid, tropical region."
2.02		
2.03	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	"The most prolific and widespread of all *Dioscorea* spp., occurring from the Atlantic coast of Africa to the remotest islands of the Pacific. It is the only major edible yam native to two continents. It occurs wild and is cultivated all over South-East Asia."
2.04	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	Yams "do not tolerate waterlogging".
2.05	Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu.	"Native to Asia and Africa, widely cultivated and now spread from the Atlantic coast of Africa throughout the Pacific and more recently to the Neotropics".
3.01	1. Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C. 2. Smith (1979) Flora Vitiensis Nova: A New Flora of Fiji. Vol. 1. Pacific Tropical Botanical Garden.	1. "*D. bulbifera* is not native to the Western Hemisphere. Nevertheless, it is so widespread that it is noted in most floras of the tropical countries of Central and South America." 2. naturalized in Fiji (an aboriginal introduction)
3.02		no evidence
3.03	Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons.	Considered a serious weed of agriculture in western Polynesia.
3.04		no evidence
3.05	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	*D. alata* considered an environmental weed in tropical Africa and the southeastern U.S.
4.01	1. Flach and Rumawas, eds. (1996) Plant	1. no description of these traits 2. stems

	Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden. 2. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu.	never with prickles
4.02		no evidence
4.03	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	no description of this
4.04		
4.05	Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C.	"On the island of Java the aerial tubers are used to make fish poison."
4.06	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	"Fungal leaf spots afflict most of the species in the field. *D. bulbifera* is moderately susceptible to attack by the yam nematode (*Scutellonema bradys*)."
4.07	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	Bulbils from wild plants are boiled and sometimes also soaked in water to remove toxic substances before being eaten. Tubers from wild plants are nauseous and poisonous.
4.08		no evidence
4.09	Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu.	In Hawaii "naturalized primarily in mesic areas, especially shaded mesic valleys and disturbed mesic forest".
4.1	1. Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden. 2. Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C.	1. "Yams need fertile soils…, rich in organic matter" 2. "*D. bulbifera* grows best in a loamy soil, preferably high in organic material."
4.11	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	growth habit: vine, forb/herb
4.12	Nehrling (1944) in Schultz (1993) Element Stewardship Abstract for *Dioscorea bulbifera*. The Nature Conservancy, Arlington, VA.	capable of forming "impenetrable masses"
5.01		terrestrial
5.02	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	Dioscoreaceae
5.03	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W.	Dioscoreaceae

	Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	
5.04	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	produces underground tubers and numerous aerial bulbils
6.01		
6.02	Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C.	"Fresh seeds germinate readily in soil or on wet filter paper in 2 to 3 weeks."
6.03		
6.04	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	dioecious
6.05	Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C.	flowers attract bees and other insects
6.06	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	"*D. bulbifera* is propagated by bulbils or by tubers."
6.07	1. Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden. 2. Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C.	1. The period from planting to harvesting is about 7-9 months. 2. "Seedlings grow to mature size and flower in 1 year…Edible aerial tubers may be produced in as little as 3 months after planting."
7.01	Schultz (1993) Element Stewardship Abstract for *Dioscorea bulbifera*. The Nature Conservancy, Arlington, VA.	Dumping of tubers or bulbils can spread the species.
7.02	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	*D. bulbifera* is cultivated all over South-East Asia.
7.03		no evidence
7.04	1. Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden. 2. Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C.	1. fruits and seeds winged 2. "The seeds are eventually dislodged by the wind and may be carried some distance from the plant. The seed is surrounded by a membranous falcate wing, which is hooked at its attachment to the placenta."
7.05	Coursey (1967) Yams: an Account of the Nature, Origins, Cultivation and Utilisation of the Useful Members of the Dioscoreaceae. Longmans, London.	"It has been noted that mature bulbils are less dense than water, whereas immature ones, like the underground tubers, are denser. This suggests a modification to aid dispersal by flood waters."
7.06		wind dispersed
7.07	Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants	fruit a long, elliptical capsule, 20-22 mm x 8-9 mm; bulbils 2.5-5 cm in diameter

	yielding non-seed carbohydrates. Backhuys Publishers, Leiden.	[no evidence of any means of attachment]
7.08		wind dispersed
8.01	1. Flach and Rumawas, eds. (1996) Plant Resources of South-East Asia. No. 9. Plants yielding non-seed carbohydrates. Backhuys Publishers, Leiden. 2. Martin (1974) Tropical yams and their potential. Part 2. *Dioscorea bulbifera*. USDA Agricultural Handbook No. 466. Washington, D.C.	1. "*D. bulbifera* flowers profusely…and produces seed abundantly." 2. up to 6 seeds per capsule
8.02		
8.03	1. Schultz (1993) Element Stewardship Abstract for *Dioscorea bulbifera*. The Nature Conservancy, Arlington, VA. 2. Langeland (2003) Natural area weeds: air potato (*Dioscorea bulbifera*). University of Florida, IFAS Extension, SS AGR 164 (http://edis.ifas.ufl.edu/pdffiles/AG/AG11200.pdf).	1. "Round-Up herbicide can be used as a foliar spray and will kill above ground growth but the subterranean tuber will frequently resprout." 2. "The herbicides Garlon 3A diluted with water to 1.25%-2.0% (1.6-2.6 ounces per gallon of spray) or Garlon 4 diluted with water to 0.5%-2.0% (0.6-2.6 ounces per gallon of spray) are effective for controlling air potato when sprayed onto the foliage."
8.04	Schultz (1993) Element Stewardship Abstract for *Dioscorea bulbifera*. The Nature Conservancy, Arlington, VA.	"Air potato stems appear to be readily killed by fire, although resprouting from the tuber is rapid."
8.05		