

**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.**

<i>Scaevola sericea (beach naupaka)</i>			
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)		
2.04	Native or naturalized in habitats with periodic inundation		
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	y	0
3.05	Congeneric weed	n	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	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	?	
4.1	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	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 fragmentation	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	n	-1
7.05	Propagules water dispersed	y	1
7.06	Propagules bird dispersed	y	1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	y	1
8.01	Prolific seed production		
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	n?	-1
8.05	Effective natural enemies present in Florida, or east of the continental divide		
<b>Total Score</b>			<b>14</b>

<b>Outcome</b>	<b>Reject*</b>
----------------	----------------

\*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	6	yes
B	11	yes
C	17	yes
total	34	yes

Data collected 2006-2007

Question number	Reference	Source data
1.01		cultivated but no evidence of selection for reduced weediness
1.02		
1.03		
2.01	1. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	1. temperature minimum: 31°F 2. hardiness zones 10-11
2.02		
2.03		
2.04		
2.05	1. van Valkenburg and Bunyaphrathatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden. 2. Thieret and Brandenburg (1986) <i>Scaevola</i> (Goodeniaceae) in southeastern United States. SIDA 11: 445-453. 3. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	1. " <i>S. taccada</i> [synonym] is found from Madagascar eastward to South-East Asia, throughout Malesia, tropical Australia, the Pacific Islands and Hawaii." 2. Introduced into the Bahamas. 3. used horticulturally
3.01	1. Thieret and Brandenburg (1986) <i>Scaevola</i> (Goodeniaceae) in southeastern United States. SIDA 11: 445-453. 2. Kairo, Ali, Cheesman, Haysom, and Murphy (2003) Invasive Species Threats in the Caribbean Region. Report to the Nature Conservancy.	naturalized in the Bahamas (1, 2)
3.02		no evidence
3.03	Waterhouse (1997) The major invertebrate pests and weeds of agriculture and plantation forestry in the southern and western Pacific. ACIAR Monograph No. 44, 99p.	Considered a major weed of agriculture in the Pacific - affects coconut and pandanus crops.
3.04	Kairo, Ali, Cheesman, Haysom, and Murphy (2003) Invasive Species Threats in the Caribbean Region. Report to the Nature Conservancy.	Considered naturalized and invasive in the Bahamas.
3.05		no evidence
4.01	van Valkenburg and Bunyaphrathatsara, eds. (2001)	no description of these traits

	Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	
4.02	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	not allelopathic
4.03	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	no description of this
4.04	Stone, Cuddihy, and Tunison (1992) Responses of Hawaiian ecosystems to removal of feral pigs and goats. Pp. 666-704 in Stone, Smith, and Tunison (eds.) Alien Plant Invasions in Native Ecosystems of Hawaii. University of Hawaii Press, Honolulu.	Percent cover of <i>S. sericea</i> increased greatly after removal of feral goats, which had browsed heavily on this species.
4.05	1. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. Stone, Cuddihy, and Tunison (1992) Responses of Hawaiian ecosystems to removal of feral pigs and goats. Pp. 666-704 in Stone, Smith, and Tunison (eds.) Alien Plant Invasions in Native Ecosystems of Hawaii. University of Hawaii Press, Honolulu.	1. no toxicity 2. browsed heavily by goats
4.06	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	"ornamental <i>S. taccada</i> [synonym] plants are affected by ringspot disease caused by a strain of the cucumber mosaic virus"
4.07	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	no toxicity
4.08		no evidence
4.09	1. Herbst and Wagner (1992) Alien plants on the northwestern Hawaiian Islands. Pp. 189-224 in Stone, Smith, and Tunison (eds.) Alien Plant Invasions in Native Ecosystems of Hawaii. University of Hawaii Press, Honolulu. 2. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida. 3. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	1. "beach naupaka cannot tolerate heavy shade" 2. full sun or partial shade 3. shade tolerance: intermediate
4.1	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	grows on sandy beaches
4.11	1. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	1. growth habit: shrub 2. "an erect spreading shrub or small tree"
4.12	Weber (2003) Invasive Plant Species of the World. CABI	"the shrub...can quickly form

	Publishing.	extensive and dense populations"
5.01		terrestrial
5.02	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	Goodeniaceae
5.03	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	Goodeniaceae; does not fix nitrogen
5.04	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	not propagated by bulbs, corms, or tubers
6.01		
6.02	1. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	propagated by seed (1, 2)
6.03		
6.04	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	"Flowers of <i>S. taccada</i> [synonym] are protandrous, thereby enhancing cross pollination." [but unclear whether self-fertilization is possible]
6.05	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	Flowers of <i>S. sericea</i> (as <i>S. taccada</i> ) "are frequently visited by bees and wasps."
6.06	1. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. Weber (2003) Invasive Plant Species of the World. CABI Publishing.	1. vegetative spread rate: slow 2. "Stems touching the soil become rooted."
6.07	1. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida. 2. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	1. moderate to rapid growth rate, shrub to 5 feet tall 2. moderate growth rate
7.01		
7.02	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	"Apart from its ornamental value <i>S. taccada</i> [synonym] is used for soil stabilization and wind and salt spray protection in coastal zones."
7.03		no evidence, and unlikely for a fairly large drupe

7.04	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	"fruit a fleshy drupe, 1-1.5 cm in diameter" [no evidence of adaptations for wind dispersal]
7.05	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	"The fruits are dispersed by...sea-currents. The fruits are buoyant because of a corky outer layer and no significant loss in viability is observed after 250 days in sea water."
7.06	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	"The fruits are dispersed by frugivorous birds"
7.07	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	"fruit a fleshy drupe, 1-1.5 cm in diameter" [no evidence of any means of attachment]
7.08		fleshy fruit
8.01	van Valkenburg and Bunyapraphatsara, eds. (2001) Plant Resources of South-East Asia. No. 12(2). Medicinal and poisonous plants. Backhuys Publishers, Leiden.	each fruit 2-seeded
8.02	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	"Seeds remain viable in sea water for a year or more"
8.03	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	"Chemical control is done by cutting the shrub to the ground and treating the cut stumps with triclopyr."
8.04	Smith and Tunison (1992) Fire and alien plants in Hawai'i: research and management implications for native ecosystems. Pp. 394-408 in Stone, Smith, and Tunison (eds.) Alien Plant Invasions in Native Ecosystems of Hawaii. University of Hawaii Press, Honolulu.	<i>S. sericea</i> is particularly sensitive to fire.
8.05		