UF IFAS UNIVERSITY of FLORIDA

Assessment of Non-native Plants in Florida's Natural Areas

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Assessment date 8 Aug 2017

	***Dioscorea polystachya* ALL ZONES**	**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) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	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 North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 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	n	0
3.04	Environmental weed	y	4
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	unk	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	unk	-1
4.05	Toxic to animals	n	0
4.06	Host for recognised pests and pathogens	n	0
4.07	Causes allergies or is otherwise toxic to humans	n	0
4.08	Creates a fire hazard in natural ecosystems	unk	0
4.09	Is a shade tolerant plant at some stage of its life cycle	n	0
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	y	1
4.12	Forms dense thickets	unk	0
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	n	0
6.02	Produces viable seed	?	
6.03	Hybridizes naturally	unk	-1
6.04	Self-compatible or apomictic	n	-1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	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)	y	1
7.08	Propagules dispersed by other animals (internally)	n	-1
8.01	Prolific seed production	n	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	n	-1
8.03	Well controlled by herbicides	y	-1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05	Effective natural enemies present in U.S.	?	
	Total Score	**12**	
	Implemented Pacific Second Screening	**no**	
	Risk Assessment Results	**High**	

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

	Reference	Source data
1.01		cultivated, but no evidence of selection for reduced weediness
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. http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896 (0-00-0000).	No computer analysis was performed. 1. Global hardiness zone: 5, 6, 7, 8, 9, 10 ; equivalent to USDA Hardiness zones: USDA Zone 5a: to -28.8 °C (-20 °F) USDA Zone 5b: to -26.1 °C (-15 °F) USDA Zone 6a: to -23.3 °C (-10 °F) USDA Zone 6b: to -20.5 °C (-5 °F) USDA Zone 7b: to -14.9 °C (5 °F) USDA Zone 8a: to -12.2 °C (10 °F) USDA Zone 8b: to -9.4 °C (15°F) USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F). 2. Native to China: China - Anhui, - Fujian, - Gansu, - Guangdong, - Guangxi, - Guizhou, - Hebei, - Henan, - Hubei, - Hunan, - Jiangsu, - Jiangxi, - Jilin, - Liaoning, - Shaanxi, - Shandong, - Sichuan, - Yunnan, - Zhejiang; Eastern Asia: Japan - Hokkaido, - Honshu, - Kyushu, - Shikoku; Korea; Taiwan
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf).	1. Distribution in the native/cultivated range occurs in Cfa, Dfa, Cwa, Dwa
2.04	1. Climate Charts. World Climate Maps. http://www.climate-charts.com/World-Climate-Maps.html#rain (8-19-2015)	1. Native to regions with annual rainfall from 19 to 195 inches of rain
2.05	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009] 3. Middleton, B. A. (2005). Water dispersal of vegetative bulbils of the invasive exotic Dioscorea oppositifolia L. in southern Illinois Journal of the Torrey Botanical Society, 132(2), 187-196. 3. Raz L. Flora of North America Editorial Committee Dioscoreaceae, Flora of North America north of Mexico. Vol. 26 (Magnoliophyta: Liliidae: Liliales and Orchidales), 2002 New YorkOxford University Press (pg. 479-485)	1. Chinese yam was likely planted as an ornamental or edible crop in the 1800s in the United States … It occurs from Texas north to Kansas and Illinois and in all eastern states as far north as Vermont and as far south as Florida 2. D. oppositifolia is native to China and was introduced into North America as an ornamental vine. 3. Introduced to the US from China
3.01	1. Islam, M. T., Keller, E. J., & Dembele, D. P. (2008). Effects of growth regulators on in vitro propagation and tuberization of four Dioscorea species. Plant Tissue Culture and Biotechnology, 18(1), 25-35. 2. Pest Risk Management Document for Dioscorea polystachya (Chinese yam) in Canada https://www.richters.com/Issues/invasive/Dioscorea_polystachya_Risk_Management_Document_eng.pdf (7-27-2017)	1. In North America, it is planted as a garden ornamental and has become naturalized in major parts of the eastern United States. 2. Naturalized in North America

3.02	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp. 3. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	1. Chinese yam has a much broader distribution than the other yams but is still most common in moist habitats. It often occurs at forest edges, along waterways, in floodplain forests, on developed land, disturbed land, and in the drainages of upland forests in southern Illinois. 2. The probable mechanism by which D .oppositifolia eliminates its neighbors is competition for light .Dioscorea oppositifolia is capable of climbing over adjacent plants and covering them in a solid blanket of leaves in a manner similar to kudzu (Pueraria montana var.lobata). 2. Initial infestations of D. oppositifolia are generally associated with human-caused disturbances, such as near old homesites and along roadways.
3.03		no evidence
3.04	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 25] 2. Drake, Sara J.; Weltzin, Jake F.; Parr, Patricia D. 2003. Assessment of non-native invasive plant species on the United States Department of Energy Oak Ridge National Environmental Research Park. Castanea. 68(1): 15-30. 3. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009] 4. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp.	1. Yams grow rapidly, and the spread of yam populations can be extensive in a short time. Dense shading and sometimes eventual mortality of low-growing herbaceous vegetation, shrubs, and tree seedlings and saplings are the most commonly described impacts of yam populations. Throughout their nonnative range, yams are often identified as aggressive, problematic species... Restricted woody regeneration and decreased species richness are reported in habitats invaded by air yam and Chinese yam. 2. A smothering effect isreported in the Oak Ridge National Environmental Research Park in Tennessee, where Chinese yam often forms large clumps that completely cover native vegetation 3. In infested areas, D. oppositifolia lowers native species richness and abundance by outcompeting and eliminating native plant species. It does this by quickly outgrowing the native herbs and seedlings, thickly blanketing all adjacent vegetation, and competitively excluding light. D. oppositifolia may also weight-down and break branches of large trees and shrubs 4. It can inhibit the establishment of tree seedlings and late-season perennials thereby reducing native plant diversity.
3.05	1. University of Florida IFAS http://edis.ifas.ufl.edu/ag112 (7-27-2017)	1. Air potato [Dioscorea bulbifera] is an invasive plant species in Florida that should be removed from public and private properties to help protect the state's natural areas.
4.01	1. Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=240001195 (7-25-2017)	No evidence of these features
4.02		no evidence
4.03	1. Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=240001195 (7-25-2017)	No evidence of these features
4.04		no evidence
4.05	1. Global Invasive Species Database (2017) Species profile: Dioscorea oppositifolia. Downloaded from http://www.iucngisd.org/gisd/species.php?sc=296 on 26-07-2017. 2. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	[no evidence of toxicity; rodents are known to feed on the bubils]

4.06	1. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	1. "Few pests and diseases" [no evidence of specific problematic pest or pathogens]
4.07	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 25] 2. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp. 3. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	[No evidence of toxicity or allergenic characteristics; long history of medicinal and nutritional use in China]
4.08	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 25]	1. Because few fire studies are reported from habitats invaded by yams, the effects of fire season, fire severity, and fire frequency on postfire recovery and establishment of yams are largely unknown
4.09	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 25] 2. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp.	1. Chinese yam similarly tolerates full sun to partial shade but may be most common at intermediate light levels 2. Found primarily in intermediate light levels
4.10	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 25] 2. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp. 3. USDA Global Soil Regions Map https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/?cid=nrcs142p2_054013 (7-27-2017)	1. Yams grow best in loose, deep, free-draining, fertile soil… Chinese yam often occurs on silty loams in alluvial habitats. Although common in rich alluvial soils, Chinese yam also occurs in semi-xeric habitats with rocky soils. Soil characteristics were described for Chinese yam populations in alluvial habitats in southern Illinois. Chinese yam occurred most often in silty loams. 2. Usually found in rich silty soil. 3. Native to regions with congruent soil characteristics
4.11	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp. 3. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	1. Yams are herbaceous, climbing, twining, perennial monocots 2. twining vine that climbs adjacent vegetation forming a thick blanket of leaves 3. Climbing vine
4.12		no evidence
5.01	1. Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=240001195 (7-25-2017)	Family: Dioscoreaceae

5.02	1. Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=240001195 (7-25-2017)	Family: Dioscoreaceae
5.03	1. Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=240001195 (7-25-2017)	1. Herbaceous
5.04	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	1. Geophyte, tuberous 2. Generates tubers
6.01		no evidence
6.02	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Middleton, B. A. (2005). Water dispersal of vegetative bulbils of the invasive exotic Dioscorea oppositifolia L. in southern Illinois1. Journal of the Torrey Botanical Society, 132(2), 187-196. 3. Raz L. Flora of North America Editorial CommitteeDioscoreaceae, Flora of North America north of Mexico. Vol. 26 (Magnoliophyta: Liliidae: Liliales and Orchidales) , 2002New YorkOxford University Press(pg. 479-485)	1. Sexually produced fruits are 3-winged capsules, but yam fruits are extremely rare in the United States and, if produced, are often sterile. Even when male and female water yams grew in close proximity, fruits were rare and seeds were typically aborted before reaching maturity. Yam seeds are winged but have not been observed in the United States 2. The species reproduces solely by bulbils in North America 3.Seeds have not been observed in North America
6.03		no evidence
6.04	1. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	1. D. oppositifolia can reproduce both sexually and asexually. Although it is capable of sexual reproduction, D. oppositifolia has not been documented to reproduce sexually in North America. This could be because it is a dioecious species, and female (pistillate) plants have not been observed in the wild.
6.05	1. Li, M. M., Yan, Q. Q., Sun, X. Q., Zhao, Y. M., Zhou, Y. F., & Hang, Y. Y. (2014). A preliminary study on pollination biology of three species in Dioscorea (Dioscoreaceae). Life Sci J, 11, 436-444. 2. Dioscorea bulbifera. USDA Agricultural Handbook No. 466. Washington, D.C. 2. Florida Exotic Pest Plant Council. http://www.fleppc.org/Manage_Plans/AirpotatoManagementPlan_Final.pdf (Accessed: 15 April 2016)	1. Pollinated by thrips 2. Staminate flowers have evolved in such a way as to force any insect entering them to contact the anthers (Coursey, 1967). Coursey (1967) states that the aromatic smells produced by many of the Dioscorea species serve as attractants for nocturnal insect species which do not require visual attractants. In general, very little has been documented about insect pollination of Dioscorea spp., and nothing is known about pollinators of D. bulbifera. Observations by Sadik and Okereke (1975) lead to the identification of a thrips (Larothrips sp.) that was found to be moving pollen from the staminate flowers to the pistillate flowers of D. cayenensis subsp. rotundata.
6.06	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Li, M. M., Yan, Q. Q., Sun, X. Q., Zhao, Y. M., Zhou, Y. F., & Hang, Y. Y. (2014). A preliminary study on pollination biology of three species in Dioscorea (Dioscoreaceae). Life Sci J, 11, 436-444. 3. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp.	1. Yam populations increase and persist through asexual regeneration. Although bulbil production is the primary means of regeneration, stems touching the ground are capable of producing adventitious roots and tubers. Sprouting is possible even from small, fragmented bulbils and can occur in nearly any environment. 2. Plants of D. polystachya on Mt. Wudang are sparsely distributed and thrip pollination, which is only possible at close range, is less likely. The main means of reproduction in this population is therefore by bulbils. These plants eventual expand their territory and reduce the distance between staminate and pistillate individuals so that sexual reproduction will eventually be possible. 3. Reproduces vegetatively by bulbils

6.07	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 25]	1. Growth from bulbils and tubers compared: Vegetative and reproductive potential increased dramatically once Chinese yam vines were established. Growth and reproductive output of 1st-year Chinese yam vines from bulbils was much less than that of 2-year-old vines from tubers near Knoxville, Tennessee. Bulbil production on vines from tubers was about 3.5 times that of vines from bulbils. Bulbils produced 1 thin vine, while tubers produced an average of 4 robust vines. There were no flowers produced on vines from bulbils, but vines from tubers did flower
7.01	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 25] 2. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp. 3. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	1. Chinese yam has a much broader distribution than the other yams but is still most common in moist habitats. It often occurs at forest edges, along waterways, in floodplain forests, on developed land, disturbed land, and in the drainages of upland forests in southern Illinois. 2. D . oppositifolia has spread from homesites where they were planted into undisturbed natural areas 3. Initial infestations of D. oppositifolia are generally associated with human-caused disturbances, such as near old homesites and along roadways. From these areas, D. oppositifolia can easily spread into nearby riparian swaths and undisturbed habitats.
7.02	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Texas Invasives http://www.texasinvasives.org/plant_database/detail.php?symbol=DIOP (7-26-2017) 3. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009]	1. Although yam bulbils are easily dislodged from the parent, primarily dispersed by gravity, and often fall near the parent plant, secondary dispersal by water, animals, or humans can increase dispersal distance… Yams are well known as an edible crop and as an attractive ornamental 2. Introduced from Asia as possible food sources in the 1800s. Ornamentals often spread by unsuspecting gardeners intrigued by the dangling yams. 3. D. oppositifolia is native to China and was introduced into North America as an ornamental vine.
7.03		no evidence
7.04	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Flora of China http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=240001195 (7-25-2017)	1. Seed dispersal: Yam seeds are winged and likely wind-dispersed 2. Seeds are winged indicating wind dispersal
7.05	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Middleton, B. A. (2005). Water dispersal of vegetative bulbils of the invasive exotic Dioscorea oppositifolia L. in southern Illinois1. Journal of the Torrey Botanical Society, 132(2), 187-196. 3. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp.	1. Although yam bulbils are easily dislodged from the parent, primarily dispersed by gravity, and often fall near the parent plant, secondary dispersal by water, animals, or humans can increase dispersal distance 2. Bulbils are present on plants starting in June and increase in size while attached to the mother plants and reach approximately full size in October before being dispersed by gravity and by water in streams from late autumn to late winter 3. It is unclear how the plants are dispersed over far distances but populations were observed throughout several watersheds appearing to have dispersed by streamflow
7.06		no evidence

7.07	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009] 3. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp.	1. Although yam bulbils are easily dislodged from the parent, primarily dispersed by gravity, and often fall near the parent plant, secondary dispersal by water, animals, or humans can increase dispersal distance 2. Bulbils might be carried by rodents (who eat and gather them) from nearby ornamental gardens
7.08		no evidence
8.01	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24] 2. Middleton, B. A. (2005). Water dispersal of vegetative bulbils of the invasive exotic Dioscorea oppositifolia L. in southern Illinois1. Journal of the Torrey Botanical Society, 132(2), 187-196. 3. Raz L. Flora of North America Editorial CommitteeDioscoreaceae, Flora of North America north of Mexico. Vol. 26 (Magnoliophyta: Liliidae: Liliales and Orchidales) , 2002New YorkOxford University Press(pg. 479-485)	1. Sexually produced fruits are 3-winged capsules, but yam fruits are extremely rare in the United States and, if produced, are often sterile. Even when male and female water yams grew in close proximity, fruits were rare and seeds were typically aborted before reaching maturity. Yam seeds are winged but have not been observed in the United States 2. The species reproduces solely by bulbils in North America 3.Seeds have not been observed in North America
8.02	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 24]	1. Experiments conducted on Chinese yam bulbils collected in Sendai, Japan, showed that immature bulbils demonstrated "summer dormancy" and required light to sprout. Mature bulbils exhibited "winter dormancy" and required chilling to sprout. Immature bulbils kept in the dark failed to sprout and died at 41 °F (5 °C), but mature bulbils chilled at the same temperature for 84 or 127 days produced sprouts when moved to a dark, warm environment. The optimum temperature for breaking "winter dormancy" was 41 °F (5 °C) [no evidence of a propagule bank persisting longer than one year]

8.03	1. Gucker, Corey L. 2009. Dioscorea spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2017, July 25] 2. Mueller, Thomas C.; Robinson, Darren K.; Beeler, Joseph E.; Main, Christopher L.; Soehn, Dana; Johnson, Kristine. 2003. Dioscorea oppositifolia L. phenotypic evaluations and comparison of control strategies. Weed Technology. 17(4): 705-710. 3. Tu, M. 2002. Element Stewardship Abstract for Dioscorea oppositifolia L. [Online] Available: www.imapinvasives.org/GIST/ESA/esapages/documnts/diosopp.pdf [May 2009] 4. Beyerl, T. 2001. Habitat and life history characteristics of Dioscorea oppositifolia, an invasive plant species in southern Illinois. M.S. Thesis, Southern Illinois University, 104pp.	1. Control method did not largely affect the abundance of Chinese yam in Great Smoky Mountains National Park. Mechanical (hand weeding, clipping) and chemical (herbicide) treatments applied soon after emergence and at flowering did not result in significant reductions in Chinese yam cover, density, stem height, or leaf production. 1b. Several sources suggest that timing of herbicide applications is important to successful yam control. Recommendations regarding effective timing vary, although most suggest growing season treatments are most effective. Applying herbicides to cut yam stems may increase effectiveness.Herbicide treatments made soon after yam emergence are generally considered ineffective, since vines often recover by the end of the growing season. Herbicides applied to Chinese yam "later" in the season may be translocated to tubers and may result in increased mortality. Others reported that herbicides were most effective on Chinese yam when they were applied at full leaf expansion but prior to the maturity of bulbils. 2. In field studies, Chinese yam was controlled better with a single herbicide application at the time of flowering than 2 herbicide applications, one soon after emergence and another at flowering 3. Herbicides currently provide the easiest method for the control of D. oppositifolia. Triclopyr (Garlon 4) or glyphosate (RoundUp or Rodeo) herbicides applied as a foliar spray, will kill bulbils, suppress further bulbil production, and work towards killing mature vines depending on the timing of applica 4. It is unknown if the glyphosate treatment would effectively prevent established tubers from resprouting and since some of the bulbils in this study survived the herbicide treatment, it is likely that more than one application would be needed to eliminate a population of D . oppositifoliation.
8.04		no evidence
8.05		no evidence