UF IFAS UNIVERSITY of FLORIDA

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

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Assessment date 1 MAY 2018

	Imperata cylindrica **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		
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	n	0
4.02	Allelopathic	unk	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	y	1
4.05	Toxic to animals	unk	0
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	unk	0
4.08	Creates a fire hazard in natural ecosystems	y	1
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	n	0
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	y	1
5.03	Nitrogen fixing woody plant	n	0

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	n	-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	n	-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	y	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	y	1
8.05		n	1
	Total Score	**23**	
	Implemented Pacific Second Screening	**no**	
	Risk Assessment Results	**High**	

section	# questions answered	satisfy minimum?
A	10	yes
B	9	yes
C	24	yes
total	43	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: 7, 8, 9, 10, 11, 12, 13; equivalent to USDA Hardiness zones: 7, 8, 9, 10, 11, 12, 13. 2. Native to Native Africa MACARONESIA: Portugal, [Madeira Islands] Spain [Canary Islands] NORTHERN AFRICA: Algeria, Egypt, Libya, Morocco, Tunisia NORTHEAST TROPICAL AFRICA: Chad, Eritrea, Ethiopia, Sudan EAST TROPICAL AFRICA: Kenya, Tanzania, Uganda WEST-CENTRAL TROPICAL AFRICA: Burundi, Cameroon, Central African Republic, Congo, Gabon, Rwanda, Zaire WEST TROPICAL AFRICA: Benin, Burkina Faso, Cote D'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo SOUTH TROPICAL AFRICA: Angola, Malawi, Mozambique, Zambia, Zimbabwe SOUTHERN AFRICA: Botswana, Lesotho, Namibia, South Africa, [Cape Province, Free State, KwaZulu-Natal, Transvaal] Swaziland Asia-Temperate ARABIAN PENINSULA: Oman, Saudi Arabia, Yemen WESTERN ASIA: Afghanistan, Cyprus, Egypt, [Sinai] Iran, Iraq, Israel, Jordan, Lebanon, Syria, Turkey CAUCASUS: Armenia, Azerbaijan, Georgia, Russian Federation [Dagestan] MIDDLE ASIA: Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan CHINA: China EASTERN ASIA: Japan, [Hokkaido, Honshu, Kyushu, Ryukyu Islands, Shikoku] Korea Asia-Tropical INDIAN SUBCONTINENT: Bhutan, India, Nepal, Pakistan, Sri Lanka PAPUASIA: Papua New Guinea
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, Cfb, Csa, Csb, BWh, Aw, Am, BSh
2.04	1. Climate Charts. World Climate Maps. http://www.climate-charts.com/World-Climate-Maps.html#rain (8-19-2015) 2. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. Native to regions with 3 to 97 inches of rainfall annually 2. Cogongrass normally is found in warm areas and thrives where annual rainfall is 75-500 c

2.05	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018) 2. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10. 3. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380.	1. Cogongrass first appeared in the area around Grand Bay, Alabama as an escape from Satsuma orange crate packing in 1912. It was intentionally introduced from the Philippines into Mississippi as a possible forage in 1921. Cogongrass was introduced into Florida in the 1930s and 1940s as a potential forage and for soil stabilization purposes. 2. It is native to Asia and was accidentally introduced to Alabama in 1912 via packing materials and intentionally imported for forage in Texas, Mississippi, Alabama, and Florida during the 1920s 3. Cogongrass (Imperata cylindrica (L.) Beauv.) is one of the most cosmopolitan grass species throughout the tropical/ subtropical regions of the world and is found on every continent except Antarctica.
3.01	1. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743. 2. UF IFAS Extension Biology and Control of Cogongrass (Imperata cylindrica) in Southern Forests http://edis.ifas.ufl.edu/fr411 (4-19-2018)	1. In the United States, cogongrass has become invasive in the southeastern gulf region 2. In the United States, it is naturalized in Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, and Oregon
3.02	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018) 2. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 3. Mississipi State University Cogongrass Factsheet https://www.gri.msstate.edu/ipams/FactSheets/Cogongrass.pdf (4-19-2018)	1. serious pest, creates monocultures 2. Cogongrass is considered to be one of the ten most troublesome and problematic weedy species in the world… It spreads and dominates in disturbed sites, often in those areas disturbed by human activities 3. Cogongrass is regulated as a Federal Noxious weed.
3.03	1. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 2. USDA Cogongrass Factsheet https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_021449.pdf (4-19-2018) 3. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10.	1. Cogongrass has been reported to suppress the growth of crops. Cogongrass is also becoming a major constraint in the forestry industry, invading and persisting in newly established pine plantations 2. Cogongrass is spreading rapidly across Alabama and the southeast, reducing forest productivity, destroying wildlife habitat, encroaching in pasture and hayland, and impacting rights-of way. 3. Cogongrass invasions can occur in diverse habitats from relatively undisturbed natural areas to pine plantations and managed pastures
3.04	1. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10. 2. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 3. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. Rapid spreading plant with past history of invasion in pine plantations and natural areas of the Southern US. The putative impacts of cogongrass invasions include community-level effects on native plant diversity and performance and ecosystem-level impacts on nutrient cycling, disturbance regimes, and decomposition 2. Once established, cogongrass outcompetes native vegetation, forming large monotypic expanses with extremely low species diversity and richness. 3. In the United States, cogongrass has become invasive in the southeastern gulf region
3.05	1. Howard, Janet L. 2005. Imperata brasiliensis, I. cylindrica. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us /database/feis/plants/graminoid/impspp/all.html [2018, April 19] 2. Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons.	1. Brazilian satintail is listed as a noxious weed in Alabama, North Carolina, Massachusetts, Vermont, and Minnesota 2. I. brasiliensis is considered a principal weed of agriculture in Trinidad, and a common weed in Argentina.

4.01		no evidence of these features
4.02	1. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10.	Possible. 1. Estrada et at. (2015) summarized the findings of avaliable research on cogongrass allelopathy: "All allelopathy studies were either greenhouse or laboratory experiments, while the disturbance studies were conducted in unmanaged natural habitats. Of the 12 studies that investigated allelopathy, 11 used either pulverized tissues or leachate and only one utilized soils from an established cogongrass population. Most allelopathy trials were conducted on crop species (e.g., cucumber, tomato, rice), and all but one study (Cerdeira et al., 2012) reported negative effects on germination and/or growth rates of test species."
4.03	1. Encyclopedia of Life http://eol.org/pages/1114980/overview (4-17-2018)	No evidence of these features
4.04	1. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 2. Clemson Regulatory Services https://www.clemson.edu/public/regulatory/plant-protection/invasive/cogongrass/index.html (4-19-2018) 3. UF Range Cattle Research and Education Center http://rcrec-ona.ifas.ufl.edu/in-focus/IF1-24-06.shtml (4-19-2018)	1. Cogongrass is occasionally used as a forage, but it can only be grazed when the plants are very young. Intensive management is needed to maintain the grass in this juvenile vegetative stage, as once the leaves mature they become virtually impalatable. 2. Cogongrass is mostly unpalatable to livestock and wildlife and can create a significant fire hazard. 3. Additionally, this weed is unpalatable to livestock because it accumulates silicates along the leaf margin, making leaves hard and razor sharp.
4.05	1. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380.	1. Cattle have been shown to develop scours when forced to graze cogongrass, and there are reports of direct injury through cut muzzles and infected hooves from the sharp tips of the leaves and rhizomes
4.06	1. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 2. Brook, R. M. (1989). Review of literature on Imperata cylindrica (L.) Raeuschel with particular reference to South East Asia. International Journal of Pest Management, 35(1), 12-25.	1. Cogongrass has been shown to harbor locusts, and there is evidence that swards of this grass is a major breeding ground for these pests. Cogongrass is also host to several polyphagous insects in cereals and an alternative host of the rust Puccinia refipes diet. 2. Host for locusts
4.07	1. Verma, J., Singh, B. P., Gangal, S. V., Arora, N., & Sridhara, S. (2000). Purification and Partial Characterization ofa 67-kD Cross-React ive Allergen from Imperata cylindrica Pollen Extract. International archives of allergy and immunology, 122(4), 251-256.	1. Verma et al. (2000) reported the isolation of a 67-kD cross-reactive allergen from cogongrass pollen containing at least three allergen determinants.
4.08	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018) 2. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 3. Clemson Regulatory Services https://www.clemson.edu/public/regulatory/plant-protection/invasive/cogongrass/index.html (4-19-2018)	1. In areas with killing frosts, the leaves will turn light brown during winter months and present a substantial fire hazard. 2. An excess of leaf biomass provides fuel for fires, as cogongrass is a pyrogenic species, relying on fire for survivability and spread. Cogongrass fires are very intense and hot, with little above-ground vegetation able to survive, thereby preventing natural secondary succession. The fires resulting from swards of cogongrass had higher maximum temperatures at greater heights and increased fire mortality of long-leaf pine, normally a fire-tolerant species. The author further hypothe- sized that the changes in fire behavior due to cogongrass in- vasion could shift sandhill ecosystems from a species-diverse pine savanna to a monotypic cogongrass grassland. 3. Cogongrass is mostly unpalatable to livestock and wildlife and can create a significant fire hazard.

4.09	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018) 2. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 3. USDA Cogongrass Factsheet https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_021449.pdf (4-19-2018)	1. Cogongrass does not tolerate dense shade. In Asian rubber plantations, cogongrass dies back upon canopy formation. 2. while it is best adapted to full sun, cogongrass can also thrive under the moderate shade of savannahs 3. It can grow in full sunlight to partial shade.
4.10	1. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 2. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. Cogongrass tolerates a wide range of soil conditions but appears to grow best in soils with acidic pH, low fertility and low organic matter. Consequently, cogongrass habitats are quite diverse, ranging from the course sands of shorelines, the fine sands or sandy loam soils of swamps and river margins, to the >80% clay soils of reclaimed phosphate settling ponds. 2. Grows on a variety of soils but is often found on highly leached soils with low pH, fertility, and organic matter
4.11		no evidence [growth form: grass; low groundcover]
4.12	1. Mississipi State University Cogongrass Factsheet https://www.gri.msstate.edu/ipams/FactSheets/Cogongrass.pdf (4-19-2018) 2. USDA Cogongrass Factsheet https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_021449.pdf (4-19-2018) 3. UF Range Cattle Research and Education Center http://rcrec-ona.ifas.ufl.edu/in-focus/IF1-24-06.shtml (4-19-2018)	1. Cogongrass produces numerous upright smooth stem 6" to 47" tall, which form loose or densely compacted stands. Because of the dense stems and rooting system, cogongrass usually chokes out existing vegetation 2. Dense stands of cogongrass can also destroy wildlife habitat. 3. Cogongrass also forms a dense mat of cover and quickly displaces desirable forage grasses.
5.01	1. Encyclopedia of Life http://eol.org/pages/1114980/overview (4-17-2018)	Family: Poaceae, perennial grass
5.02	1. Encyclopedia of Life http://eol.org/pages/1114980/overview (4-17-2018)	Family: Poaceae, perennial grass
5.03	1. Encyclopedia of Life http://eol.org/pages/1114980/overview (4-17-2018)	Family: Poaceae, perennial grass
5.04		No evidence of these features. Family: Poaceae, perennial grass
6.01		no evidence
6.02	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018) 2. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10. 3. SANTIAGO, A. (1965). Studies in autecology of Imperata cylindrica (L.) Beauv.(1812). Studies in autecology of Imperata cylindrica (L.) Beauv.(1812).	1. Seeds are extremely small and attached to a plume of long hairs. Although the seeds can be carried long distances by wind and animals, the spread of cogongrass by seed is questionable and still under investigation. 2. For cogongrass, a single plant can produce as many as 3000 seeds and germination rates may be as high as 98% 3. 95% germination within one week after harvest and seed viability lasting at least one year.
6.03	1. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10.	1. No evidence of hybridization in invasion contexts
6.04	1. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10. 2. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 3. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. Cogongrass must outcross to produce viable seed 2. Seed production populations shown to be self-incompatible 3. Never reproduces from self-pollination
6.05		Grasses are typically wind pollinated

6.06	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018) 2. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10. 3. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380.	1. Rhizomes are responsible for the survival and short-distance spread of cogongrass. Established stands may produce over 3 tons of rhizomes per acre. The specialized anatomy of the rhizome allows for water conservation. The rhizome can also penetrate to a depth of 4 feet in the soil, although the majority of rhizomes remain in the top 6 inches. 2. Cogongrass also produces prolific rhizomes and rhizome fragments as small as 0.1 g may produce new plants 3. Spread via rhizomes
6.07	1. Tominaga, T. (2003). Growth of seedlings and plants from rhizome pieces of cogongrass (Imperata cylindrica (L.) Beauv.). Weed Biology and Management, 3(3), 193-195. 2. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. Work by Tominaga (2003) showed the presence of rhizomes after 12 weeks, but tiller formation occurred at 3 to 4 weeks from seedlings. Moreover, Tominaga (2003) showed seedlings produce greater numbers of rhizomes and rhizomes of greater length within one year of establishment. 2. Reproductive rhizomes can form with 8 weeks
7.01	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018) 2. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10. 3. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. Unfortunately, cogongrass was spread by illegal plantings and inadvertent transport in forage and in soil during roadway construction. It does not survive in cultivated areas but becomes established along roadways, in forests, parks, and mining areas 2. Multiple studies suggest cogongrass initially establishes in highly disturbed habitats, such as along trails, roadsides, and riparian areas 3. It does not survive in heavily cultivated areas but thrives on roadways and in pastures and mining areas, pine forests, parks, and other recreational areas... In Mississippi, distribution patterns indicate that cogongrass establishes sporadically, possibly through wind dispersal or by rhizomes being carried in fill during road construction
7.02	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018) 2. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. Unfortunately, cogongrass was spread by illegal plantings and inadvertent transport in forage and in soil during roadway construction. It does not survive in cultivated areas but becomes established along roadways, in forests, parks, and mining areas 2. Main points of introduction include university experiment stations, U.S. Soil Conservation Service reclamation sites, and U.S. Department of Agriculture plant introduction facilities
7.03		no evidence
7.04	1. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10. 2. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 3. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. Seeds are extremely small and attached to a plume of long hairs. Although the seeds can be carried long distances by wind and animals, the spread of cogongrass by seed is questionable and still under investigation. 2. prolific wind-disseminated seed production 3. Aerodynamic properties of spikelet clumps facilitate wind dispersal of seeds up to 24 km over open country
7.05		no evidence
7.06		no evidence
7.07	1. UF IFAS https://plants.ifas.ufl.edu/plant-directory/imperata-cylindrica/ (4-13-2018)	1. Seeds are extremely small and attached to a plume of long hairs. Although the seeds can be carried long distances by wind and animals, the spread of cogongrass by seed is questionable and still under investigation.
7.08		no evidence

8.01	1. Estrada, J. A., & Flory, S. L. (2015). Cogongrass (Imperata cylindrica) invasions in the US: Mechanisms, impacts, and threats to biodiversity. Global Ecology and Conservation, 3, 1-10. 2. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 3. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. For cogongrass, a single plant can produce as many as 3000 seeds and germination rates may be as high as 98% 2. Cogongrass is also a prolific seed producer, with over 3000 seeds per plant. 3. A singl;e plant may produce as many as 3,000 seeds contained in hair-covered spikelet
8.02	1. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743. 2. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380.	1. Seeds have no dormancy 2. no dormancy mechanisms were observed in seed
8.03	1. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380. 2. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743.	1. To date, the most effective herbicides for cogongrass management are glyphosate and imazapyr. These materials are broad-spectrum, systemic herbicides that have been shown to provide good control of cogongrass for one year after application 2. Imazapyr and glyphosate are the most effective herbicides for cogongrass control. Younger cogongrass shoots are very susceptible to these herbicides; however, longer term control of adult plants requires translocation and thereby control of the rhizome
8.04	1. Dozier, H., Gaffney, J. F., McDonald, S. K., Johnson, E. R., & Shilling, D. G. (1998). Cogongrass in the United States: history, ecology, impacts, and management. Weed Technology, 737-743. 2. Mississipi State University Cogongrass Factsheet https://www.gri.msstate.edu/ipams/FactSheets/Cogongrass.pdf (4-19-2018)	1. Shallow tillage fragmented rhizomes will cause short-term growth reduction and subsequent strong shoot growth 2. Mowing or burning will remove above-ground cogongrass vegetation, but opens the plant canopy for emergence of seedlings and new stems from rhizomes
8.05	1. MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380.	1. Although several organisms have been found and tested, several researchers state there is little hope of finding a successful biological control for cogongrass. They claim the distribution of this species is so widespread worldwide that the chances of finding a biological control agent in an area where it does not exist are slight.