

<i>Microstegium vimineum</i> (Japanese stiltgrass, Nepalese browntop)		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 in regions with an average of 11-60 inches of annual precipitation	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		
3.04	Environmental weed	y	4
3.05	Congeneric weed		
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	y	1
4.05	Toxic to animals		
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans		
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	y	1
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	n	0
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		
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators		
6.06	Reproduction by vegetative propagation	n	-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		
7.03	Propagules likely to disperse as a produce contaminant	y	1
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed	y	1
7.06	Propagules bird dispersed		
7.07	Propagules dispersed by other animals (externally)	y	1
7.08	Propagules dispersed by other animals (internally)		

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 U.S.		
	Total Score		24
	Implemented Pacific Second Screening		no
	Risk Assessment Results		Reject

	Reference	Source data
1.01		
1.02		Skip to question 2.01 since question 1.01 received a No.
1.03		Skip to question 2.01 since question 1.01 received a No.
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. Global Invasive Species Database (http://www.issg.org/database/species/distribution.asp?si=686&fr=1&sts=&lang=EN [accessed 3/25/2013]) 3. USDA Plants database (www.plants.usda.gov [accessed 3/25/2013])	No computer analysis was performed. 1. Global plant hardiness 1-9. 2. Native distribution across Asia including China, Japan, Korea, Malaysia, Thailand, and Taiwan. 3. Distribution in US 25+ states from southeast to northeast and midwest.
2.02		No computer analysis was performed. Native range is well known; refer to 2.01 source data.
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. Flora of China (http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200025707 [accessed 4/21/2013]) 3. Dave's Garden Plant database http://davesgarden.com/guides/pf/go/65591/ [accessed 4/21/2013])	1. Distribution in the native and cultivated ranges is widespread; at least 3 climatic groups (Cfa, Cfb, Dfa). 2. Distribution "Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, NE India, Japan, Korea, Myanmar, Nepal, Philippines, Russia, Vietnam; SW Asia (Iran); introduced in America and elsewhere]." 3. 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 7a: to -17.7 °C (0 °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) USDA Zone 11: above 4.5 °C (40 °F)
2.04	1. USDA-NRCS Prism (http://www.wcc.nrcs.usda.gov/climate/prism.html [accessed 4/21/2013])	1. Growing in United States in areas receiving a range of precipitation from 36-70 inches
2.05	1. Global Invasive Species Database (http://www.issg.org/database/species/distribution.asp?si=686&fr=1&sts=&lang=EN [accessed 3/25/2013]) 2. USDA Plants database (www.plants.usda.gov [accessed 3/25/2013]) 3. USDA Forest Service (http://www.fs.fed.us/database/feis/plants/graminoid/micvim/al.html [accessed 4/21/2013]) 4. USDA invasive species info (http://www.invasivespeciesinfo.gov/plants/stiltgrass.shtml [accessed 4/21/2013])	1. Repeated introductions throughout United States, also listed as "Alien" in Turkey. 2. It has invaded portions of Asia where it is nonnative, extending its range into Pakistan, Nepal [72], and Turkey [178]. Japanese stiltgrass is nonnative in the United States and Mexico; Europe; Australia and New Zealand; Africa; South America; and islands of the Atlantic, Pacific, and Indian oceans [220]. 3. Most likely introduced to US as packing material from China.

3.01	1. Weber E 2003. Invasive Plant Species of the World CAB International Cambridge, MA, USA p269 2. USDA PLANTS profile (www.plants.usda.gov [accessed 3/25/2013]) 3. USDA Forest Service (http://www.fs.fed.us/database/feis/plants/graminoid/micvim/al.html [accessed 4/21/2013])	1. Present across Europe, Australasia, Africa, South America, North America, etc. 2. Present in 24 states and Puerto Rico. Class C noxious weed in AL. Invasive, banned in CN. Prohibited in MA. 3. It has invaded portions of Asia where it is nonnative, extending its range into Pakistan, Nepal [72], and Turkey [178]. Japanese stiltgrass is nonnative in the United States and Mexico; Europe; Australia and New Zealand; Africa; South America; and islands of the Atlantic, Pacific, and Indian oceans [220]. 4. Multiple other references for this plants naturalization
3.02	1. PCA Fact Sheet (www.nps.gov/plants/alien/ [accessed 3/24/2013]) 2. Christen, Matlack (2009) The habitat and conduit functions of roads in the spread of three invasive plant species. Biol Inv 11: 453-465.	1. "Occurs in wide variety of habitats including roadsides, ditches utility corridors, and gardens." 2. "roads and open sites proved to be better locations for the germination and growth of <i>Microstegium vimineum</i> than non-roadside and closed-canopy sites"
3.03		no evidence
3.04	1. Kleczewski, Flory, Nice (2011) An Introduction to <i>Microstegium vimineum</i> (Japanese stiltgrass/Nepalese browntop) an Emerging Invasive Grass in the Eastern United States (www.btny.purdue.edu/weedscience/2011/Microstegium-01.pdf) 2. Flory, Clay (2010) Non-native grass invasion supresses forest succession. Oecologia 164: 1029-1038. 3. Adams and Engelhardt (2009) Diversity declines in <i>Microstegium vimineum</i> (Japanese stiltgrass) patches. Biol Cons 142: 1003-1010. 4. Tu M (2000) Element Stewardship Abstract for <i>Microstegium vimenium</i> . The Nature Conservancy (accessed from http://www.imapinvasives.org/GIST/ESA/esapages/micrvimi.html , 3/26/2013).	1. quickly crowd out native species, resulting in significant reductions in herbaceous species productivity and diversity 2. Suppression of tree regeneration by <i>Microstegium</i> invasions may slow the rate of forest succession and alter tree species composition. 3. <i>Microstegium vimineum</i> was associated with local declines in species richness and cover of native species. <i>M. vimineum</i> has effects on community structure that may have long-term consequences for biodiversity. 4. Usurp nesting habitat from quail and other wildlife, creates excelent habitat for rats that often prey on the nests of common bobwhites. 5. Many citations in primary literature documenting ecosystem/environmental impacts
3.05		no evidence
4.01		
4.02	1. Woods (1989) Control of <i>Paulownia tomentosa</i> and <i>Microstegium vimineum</i> in national parks. A report to the Great Smokey Mountains National Park (cited in Tu (200)) 2. Corbett and Morrison (2012) The allelopathic potentials of the non-native invasive plant <i>Microstegium vimeneum</i> and the native <i>Ageratina altissima</i> : two dominant species of the Eastern forest herb layer. Northeastern Nat 19: 297-312.	no evidence 1. There is no evidence of allelopathic inhibition. 2. native white snakeroot had stronger allelopathic potential than <i>Microstegium</i> in germination and factorial greenhouse studies.
4.03		
4.04	1. Tu M (2000) Element Stewardship Abstract for <i>Microstegium vimenium</i> . The Nature Conservancy (accessed from http://www.imapinvasives.org/GIST/ESA/esapages/micrvimi.html , 3/26/2013). 2. Dave's Garden Plant database http://davesgarden.com/guides/pf/go/65591/ [accessed 4/21/2013])	1. Cattle, deer, and goats avoid feeding on it. 2. Resistant to deer
4.05		no evidence

4.06	1. Kleczewski, Flory, Nice (2011) An Introduction to <i>Microstegium vimineum</i> (Japanese stiltgrass/Nepalese browntop) an Emerging Invasive Grass in the Eastern United States Caused by a <i>Bipolaris</i> sp. (www.btny.purdue.edu/weedscience/2011/Microstegium-01.pdf) 2. Kleczewski and Flory (2010) Leaf Blight Disease on the Invasive Grass <i>Microstegium vimineum</i> . <i>Plant Disease</i> 94:807-811 3. Kumar et al. (2002) <i>Bipolaris sorokiniana</i> , a cereal pathogen of global concern: cytological and molecular approaches towards better control. <i>Molecular Plant Pathology</i> 3:185-195	1. Some populations infected with the disease is called Leaf Blight Disease which may be caused by several related fungal pathogens 2. a <i>Bipolaris</i> sp. caused foliar lesions and reduced seed head production on the invasive grass <i>M. vimineum</i> . 3. Some species of <i>Bipolaris</i> affect wheat and corn
4.07		no evidence
4.08	1. Flory (pers. comm.) 2. Dibble et al. (2005) Does the lack of reference ecosystems limit our science? A case study in nonnative invasive plants as forest fuels. <i>Journal of Forestry</i> . 103(7): 329-338.	1. Presence of <i>Microstegium</i> results in increased flame height, peak temperatures, and duration of time fire sustained at peak temperatures. 2. standing dead and down litter of Japanese stiltgrass and other nonnative invasive grasses may present a fuel hazard in drought years
4.09	1. Weber E 2003. <i>Invasive Plant Species of the World</i> CAB International Cambridge, MA, USA p269 2. Winter, Schmitt, Edwards, (1982) <i>Microstegium vimineum</i> , a shade adapted C4 grass. <i>Plant Science Letters</i> . 24: 311-318 3. Horton and Neufeld (1998) Photosynthetic responses of <i>Microstegium vimineum</i> (Trin.) A. Camus, a shade tolerant, C4 grass, to variable light environments. <i>Oecologia</i> . 114: 11-19. 4. Woods FW (1989) Control of <i>Paulownia tomentosa</i> and <i>Microstegium vimineum</i> in national parks. A report to The Great Smokey Mountains National Park 5. Flory, Rudgers, Clay (2007) Experimental light treatments affect invasion success and the impact of <i>Microstegium vimineum</i> on the resident community. <i>Nat Area J</i> 27: 124-132.	1. Although a C4 grass, this plant is adapted to low light conditions. In native habitat, grows on shady riverbanks in broad leaved forests. 2-3. Shade tolerant C4 grass. Usually found under moderate to dense shade in moist conditions. 4. Can produce viable seed in 5% full sunlight. 5. <i>Microstegium</i> dominated native <i>Dichanthelium</i> when grown in a common garden in full shade
4.10	1. Tu M (2000) Element Stewardship Abstract for <i>Microstegium vimineum</i> . The Nature Conservancy (accessed from http://www.imapinvasives.org/GIST/ESA/esapages/micrvimi.html , 3/26/2013). 2. Nagy et al. Japanese stilt grass (<i>Microstegium vimineum</i>), a nonnative invasive grass, provides alternative habitat for native frogs in a suburban forest. <i>Urban Habitats</i> 6: http://www.urbanhabitats.org/v06n01/japanesestiltgrass_full.html 3. Gibson, Spyreas, Benedict (2002) Life history of <i>Microstegium vimineum</i> (Poaceae), an invasive grass in southern Illinois. <i>J Torr Bot</i> 129: 207-219	1. Can grow in acidic soils (pH 5.8-4.8). Some populations grow on soils derived from limestone. Often grow in silty loams, sandy loams, or loams. 2. Tolerant to many soil types. 3. In a study conducted in Illinois, MV growing in soils were generally acidic and nutrient poor
4.11	1. Flory and Clay (2010) Non-native grass invasion suppresses forest succession. <i>Oecologia</i> 164:1029-1038 2. Invasive Plants in Pennsylvania Japanese Stilt Grass (www.dcnr.state.pa.us/cs/groups/public/.../dcnr_010258.pdf [accessed 4/21/2013])	1. Smothering growth habit "Invaded plots had 120% more thatch biomass, a physical barrier to seedling establishment" 2. "After it dies back in late fall, it forms a thick layer of smothering thatch that is slow to decompose."
4.12		no evidence
5.01		no evidence
5.02	1. USDA PLANTS profile (www.plants.usda.gov [accessed 3/25/2013]) 2. USDA GRIN (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?316751#uses [accessed 3/26/2013])	Poaceae
5.03		
5.04		

6.01		
6.02	1. Hubener (2011) Seed Mass, Viability, and Germination of Japanese Stiltgrass (<i>Microstegium vimineum</i>) under Variable Light and Moisture Conditions. <i>Invasive Plant Sci Manage</i> 4:274-283. 2. Barden (1987) Invasion of <i>Microstegium vimineum</i> (Poaceae), an exotic, annual, shade-tolerant, C4 grass, into a North Carolina floodplain. <i>Am Midl Nat</i> 118:40-45. 3. Tu M (2000) Element Stewardship Abstract for <i>Microstegium vimineum</i> . The Nature Conservancy (accessed from http://www.imapinvasives.org/GIST/ESA/esapages/micrvimi.html , 3/26/2013).	1. Field collected seeds from 9 pops had up to 85% viability and mean germination rates up to 51%. 2. Seedlings continue to emerge from seedbank up to 3 years after experimentally removing MV seed source. 3. seeds remain viable in the soil for 3-5 years
6.03		no evidence
6.04	1. Kleczewski, Flory, Nice (2011) An Introduction to <i>Microstegium vimineum</i> (Japanese stiltgrass/Nepalese browntop) an Emerging Invasive Grass in the Eastern United States (www.btny.purdue.edu/weedscience/2011/Microstegium-01.pdf) 2. Huebner (2003) Vulnerability of oak-dominated forests in West Virginia to invasive exotic plants: temporal and spatial patterns of nine exotic species using herbarium records and land classification data. <i>Castanea</i> . 68(1): 1-14.	1. Flowers can be self and cross pollinated
6.05		no evidence
6.06	1. Cheplick (2008) Growth trajectories and size-dependent reproduction in the highly invasive grass <i>Microstegium vimineum</i> <i>Biol Inv</i> 10: 761-770. 2. Radford, Ahles, Bell, Ritchie (1968) <i>Manual of the vascular flora of the Carolinas</i> . Chapel Hill, NC: The University of North Carolina Press. 1183 p.	1. MV is a "summer annual depending on overwintering caryopses for germination and establishment in early spring." 2. MV is an annual reproducing by seed. Individual plants spread as new culms can grow from each node.
6.07	1. Cheplick (2008) Growth trajectories and size-dependent reproduction in the highly invasive grass <i>Microstegium vimineum</i> <i>Biol Inv</i> 10: 761-770. 2. Radford, Ahles, Bell, Ritchie (1968) <i>Manual of the vascular flora of the Carolinas</i> . Chapel Hill, NC: The University of North Carolina Press. 1183 p.	1. MV is a "summer annual depending on overwintering caryopses for germination and establishment in early spring." 2. MV is an annual reproducing by seed.
7.01	1. Swearington (1999) Japanese stilt grass: <i>Microstegium vimineum</i> (Trin.) Camus. National Park Service, Plant Conservation Alliance, Alien Plant Working Group [accessed 4/22/2013]. 3. Global Invasive Species Database (http://www.issg.org/database/species/ecology.asp?si=686&fr=1&sts=&lang=EN [assessed 3/25/2013]) 2. Tu M (2000) Element Stewardship Abstract for <i>Microstegium vimineum</i> . The Nature Conservancy (accessed from http://www.imapinvasives.org/GIST/ESA/esapages/micrvimi.html , 3/26/2013).	1. Can adhere to clothing and have been observed being transported on automobiles. 2. Seeds transported in hay and soil in agricultural areas.
7.02		no evidence
7.03	1. PCA Fact Sheet (www.nps.gov/plants/alien/ [accessed 3/24/2013]) 2. Swearington (1999) Japanese stilt grass: <i>Microstegium vimineum</i> (Trin.) Camus. National Park Service, Plant Conservation Alliance, Alien Plant Working Group [accessed 4/22/2013]. 3. Global Invasive Species Database (http://www.issg.org/database/species/ecology.asp?si=686&fr=1&sts=&lang=EN [assessed 3/25/2013])	1. Seeds can be moved in contaminated soil, hay, or potted plants 2. transported in hay and soil in agricultural areas
7.04		Caryopsis

7.05	1. Swearington (1999) Japanese stilt grass: <i>Microstegium vimineum</i> (Trin.) Camus. National Park Service, Plant Conservation Alliance, Alien Plant Working Group [accessed 4/22/2013]. 2. Romanello, Genevieve Allen. 2009. <i>Microstegium vimineum</i> invasion in central Pennsylvanian slope, seep wetlands site comparisons, seed bank investigation and water as a vector for dispersal. University Park, PA: The Pennsylvania State University. 104 p. Thesis. 3. Global Invasive Species Database (http://www.issg.org/database/species/ecology.asp?si=686&fr=1&sts=&lang=EN [assessed 3/25/2013]) 4. PCA Fact Sheet (www.nps.gov/plants/alien/ [accessed 3/24/2013])	1-2. Floating fruits can disperse throughout wetlands or alluvial floodplain during times of high water. 3. Floating vegetation/debris -litter and seeds are undoubtedly moved in floodwaters, including overland flow on slopes (not always from a stream)-Joan Ehrenfeld pers. comm 2005 cited in ISSG. 4. Seed may be carried further by water currents during heavy rain.
7.06	1. Swearington (1999) Japanese stilt grass: <i>Microstegium vimineum</i> (Trin.) Camus. National Park Service, Plant Conservation Alliance, Alien Plant Working Group [accessed 4/22/2013]. 2. Bean and McClellan eds. (1997) Japanese grass or eulalia-- <i>Microstegium vimineum</i> (Trin.) A. Camus,	1-2. Seeds can attach to fur, feathers, etc. no evidence of viability after gut passage.
7.07	[Online]. In: Tennessee exotic plant management manual. Southeast Exotic Pest Plant Council (http://www.se-eppc.org/states/doc.cfm?id=499 [accessed 4/21/2013])	1-2. Seeds can attach to fur, feathers, etc. 2. Small seeds often adhere to animal fur
7.08		no evidence
8.01	1. Kleczewski, Flory, Nice (2011) An Introduction to <i>Microstegium vimineum</i> (Japanese stiltgrass/Nepalese browntop) an Emerging Invasive Grass in the Eastern United States (www.btny.purdue.edu/weedscience/2011/Microstegium-01.pdf) 2. Tu M (2000) Element Stewardship Abstract for <i>Microstegium vimineum</i> . The Nature Conservancy (accessed from http://www.imapinvasives.org/GIST/ESA/esapages/micrvimi.html , 3/26/2013).	1. Single tiller can produce between 100 and 1000 seeds 2. individual plant can produce up to 1000 seeds
8.02	1. Hubener (2011) Seed Mass, Viability, and Germination of Japanese Stiltgrass (<i>Microstegium vimineum</i>) under Variable Light and Moisture Conditions. <i>Invasive Plant Sci Manage</i> 4:274-283. 2. Barden (1987) Invasion of <i>Microstegium vimineum</i> (Poaceae), an exotic, annual, shade-tolerant, C4 grass, into a North Carolina floodplain. <i>Am Midl Nat</i> 118:40-45. 3. Tu M (2000) Element Stewardship Abstract for <i>Microstegium vimineum</i> . The Nature Conservancy (accessed from http://www.imapinvasives.org/GIST/ESA/esapages/micrvimi.html , 3/26/2013).	1-3 Seeds remain viable in the soil for 3-5 years (see question 6.02)
8.03	1. Flory SL 2010 Management of <i>Microstegium vimineum</i> Invasions and Recovery of Resident Plant Communities. <i>Restoration Ecology</i> 18:103-112. 2. Judge CA, Neal JC, Derr JF (2005) Response of Japanese stiltgrass to application timing, rate, and frequency of postemergent herbicides. <i>Weed Technology</i> 19: 912-917	1. Postemergent grass specific herbicide effectively removed MV invasions, prevented reinvasion the following spring, and promoted the recovery of resident plant communities. 2. Evidence that land managers have multiple options for timing, rate, and frequency of applications to control MV.
8.04	1. Oswald and Oswald (2007) Winter litter disturbance facilitates the spread of the nonnative invasive grass <i>Microstegium vimineum</i> (Trin.) A. Camus. <i>Forest Ecol Manage</i> 249:199-203. 2. Tu M (2000) Element Stewardship Abstract for <i>Microstegium vimineum</i> . The Nature Conservancy (accessed from http://www.imapinvasives.org/GIST/ESA/esapages/micrvimi.html , 3/26/2013).	1. winter litter removal (burn, harvest activities, floodwater scour, or animal activities) can increase MV spread and may enhance potential ecological impacts of invasions by increasing <i>M. vimineum</i> percent cover. Mowing or burning early in season does not control, new seedlings emerge where habitat is cleared.

8.05		no evidence
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