UF IFAS UNIVERSITY of FLORIDA

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

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Assessment date 22 March 2017

	Rosa multiflora **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	y	4
3.04	Environmental weed	y	4
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	y	1
4.02	Allelopathic	unk	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	unk	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	?	
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	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	n	0
6.02	Produces viable seed	y	1
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		
7.05	Propagules water dispersed		
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	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		y	-1
	Total Score	**22**	
	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: 6, 7, 8, 9, 10, 11; equivalent to USDA Hardiness zones: 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 11a: to USDA Zone (40 °F) USDA Zone 11b: to (45 °F). 2. Native to China: China - Anhui, - Zhejiang, - Fujian, - Henan, - Hebei, - Hunan, - Gansu, - Jiangxi, - Jiangsu, - Guangdong, - Guizhou, - Shandong, - Shaanxi, - Guangxi; Eastern Asia: Japan - Hokkaido, - Honshu, - 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, Cwa, Aw, Cwb, 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 19 - 97 inches of rain annually
2.05	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. Epstein, A. H., Hill, J. H., & Nutter Jr, F. W. (1997). Augmentation of rose rosette disease for biocontrol of multiflora rose (Rosa multiflora). Weed science, 172-178. 3.PIER http://www.hear.org/pier/species/rosa_multiflora.htm (12-2-2016)	1. R. multiflora was originally introduced to North America in 1866 as a rootstock onto which other rose species or cultivars were grafted 2. The species was actively promoted and spread throughout North America for its utility as a living fence, to reduce soil erosion 3. Introduced to British Colombia, Canada, and the West Coast of the United States
3.01	1. Epstein, A. H., Hill, J. H., & Nutter Jr, F. W. (1997). Augmentation of rose rosette disease for biocontrol of multiflora rose (Rosa multiflora). Weed science, 172-178. 2. University of Maine Cooperative Extension https://extension.umaine.edu/publications/2509e/ (12-7-2016) 3. University of Connecticut http://hort.uconn.edu/detail.php?pid=436 (12-7-2016)	1. Multi-flora rose has become naturalized in many areas of the central and eastern U.S 2. Multiflora rose is now naturalized (established and reproducing in the wild) throughout much of the United States. In Maine, it is documented in Oxford, Waldo, and York Counties, but likely occurs in more. 3. widely naturalized throughout the United States
3.02	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. The New York Invasive Species Clearinghouse, Cornell University Cooperative Extension http://nyis.info/index.php?action=invasive_detail&id=33 (12-7-2016)	1. Multiflora rose has been declared a noxious weed in many states, including Kansas, Iowa, Missouri, Ohio, Pennsylvania, and West Virgina. 2. Multiflora rose is extremely prolific and can form dense thickets, excluding native plants species. This non-native invasive rose invades open woodlands, forest edges, early succession pastures and fields. It also invades fence rows, right-of ways, roadsides, and margins of swamps and marshes.

3.03	1. Labisky, R.F. and W.L. Anderson. 1965. Effect of multiflora rose on corn yields in adjacent fields. Journal Wildlife Management 29: 192-195. 2. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 3. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5] 4. Dale F. Hindal, & Wong, S. (1988). Potential Biocontrol of Multiflora Rose, Rosa multiflora. Weed Technology, 2(2), 122-131.	1. rose hedges lower the crop yields on adjacent fields by competing for nutrients 2. It is mainly a threat to agricultural land 3. It invades pasture areas, degrades forage quality, reduces grazing area and agricultural productivity and can cause severe eye and skin irritation in cattle 3. Serious weed of agriculure in West Virginai, invading pastures and agricutlural lands, leaving them unfit for crops.
3.04	1. Forest Invasive Plants Resource Center Rosa Multiflora http://na.fs.fed.us/spfo/invasiveplants/factsheets/pdf/multiflora-rose.pdf (12-5-2016) 2. University of Maine Cooperative Extension https://extension.umaine.edu/publications/2509e/ (12-7-2016) 3. Southeast Exotic Pest Plant Council Invasive Plant Manual http://www.se-eppc.org/manual/multirose.html (12-7-2016)	1. Multiflora rose readily invades forest edges, open woodlands and plantations. It can form dense thickets, replace native vegetation and inhibit regeneration of trees. 2. Multiflora rose is an aggressive colonizer of open unplowed land and is highly successful on forest edges. This prolific seed producer can create extremely dense, impenetrable thickets that crowd out other vegetation and inhibit regrowth of native plants. Dense stands of multiflora rose can slow down forest regeneration: the species can dominate a forest understory. 3. Multiflora rose spreads rapidly into adjacent fields and undisturbed areas, often forming monotypic thickets. Many states list it as a noxious weed.
3.05	1. Holm, LeRoy G. A Geographical Atlas of World Weeds. Malabar, FL: Krieger Pub., 1991. Print.	1. Rosa rubiginosa is a principle weed in Australia and New Zealand
4.01	1. Encyclopedia of Life http://eol.org/pages/630393/details (12-2-2016)	1. The red to green twigs may have numerous recurved thorns and other thornless specimens occur infrequently in the eastern United States.
4.02		no evidence
4.03	1. Encyclopedia of Life http://eol.org/pages/630393/details (12-2-2016)	no evidence of these characteristics

4.04	1. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5] 2. Luginbuhl, J. M., Green Jr, J. T., Poore, M. H., & Conrad, A. P. (2000). Use of goats to manage vegetation in cattle pastures in the Appalachian region of North Carolina. Sheep & Goat Research Journal, 16(3), 124-135.	1. Domestic sheep and goats will feed on leaves, new buds, and new shoots. Foraging goats in pastures with severe multiflora rose infestations resulted in the virtual elimination of multiflora rose within 4 seasons. 2. Abstract: Much of hill-land pasture in the Appalachian region of the United States is dominated by herbaceous weeds and brush. Low cost, low input and environmentally acceptable reclamation procedures are needed to maintain the productivity of these pastures. This experiment evaluated the effectiveness of using goats (Capra hircus hircus) alone (30 mature, brush does/ha) or cattle (Bos taurus) with goats (17 mature, brush does/ha + two to three steers/ha - 225 kg average live weight) to reclaim a pasture from an abandoned, overgrown 5.9 ha orchard left untouched for 15 years. Over four grazing seasons, managed defoliation resulted in a substantial increase in herbaceous vegetative cover in plots grazed by goats alone (65 to 86%) and by goats with cattle (65 to 80%) while vegetative cover decreased from 70 to 22% in the control plot. Similarly, the cover by grass species increased in the grazed plots (goats: 16 to 63%; goats + cattle: 13 to 54%) while averaging 10% in the control plot. Multiflora rose (Rosa multiflora Thumb.) bushes were practically eliminated after four grazing seasons as quantified by an average reduction in height from 2.1 m to 0.6 m, and by the number of dead canes (stems) in both the goat (100%) or goat + cattle (92%) treatments. Results indicated that the foraging habits of goats resulted in the elimination of multiflora rose bushes and in a significant increase in desirable forage species."
4.05		no evidence. See Question 4.04
4.06	1. Jesse, L. C., Nason, J. D., Obrycki, J. J., & Moloney, K. A. (2010). Quantifying the levels of sexual reproduction and clonal spread in the invasive plant, Rosa multiflora. Biological invasions, 12(6), 1847-1854. 2. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5] 3. Penn State Extension http://extension.psu.edu/pests/weeds/control/multiflora-rose-management-in-grass-pastures-an-integrated-approach (12-12-2016)	1. R. multiflora in Iowa is susceptible to rose rosette disease 2. Multiflora rose is highly susceptible to rose rosette disease (RRD), which is transmitted by the eriophyid mite Phyllocoptes fructiphilus 3. Insect pests include the tortricid hip borer, which consumes parts of the flower; the rose seed chalcid, which destroys the seeds; and the raspberry cane borer, which kills the stems. The larvae in each case are responsible for the injury.
4.07	1. Pollen Library http://www.pollenlibrary.com/Specie/Rosa+multiflora/ (12-7-2016)	Insufficient evidence for a yes answer. 1. Rambler Rose (Rosa multiflora) is a mild allergen.
4.08	1. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5]	1. Results of fire regime evaluation inconclusive per lack of research, but unlikely

4.09	1. The New York Invasive Species Clearinghouse, Cornell University Cooperative Extension http://nyis.info/index.php?action=invasive_detail&id=33 (12-12-2016) 2. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 3. Dlugos, D. M., Collins, H., Bartelme, E. M., & Drenovsky, R. E. (2015). The non-native plant Rosa multiflora expresses shade avoidance traits under low light availability. American Journal of Botany, 102(8), 1323-1331.	1. Multiflora rose thrives in full and partial sun with well-drained soils. While it grows most vigorously in full sun, it can also grow in the shade, and will persist for many years under a tree canopy although it may not flower or fruit very heavily. 2. multiflora rose endures shade or sun 3. In the field, shrub density and fecundity of R. multiflora sharply increased with light availability. However, no differences were observed between forest edge and interior seed banks. Rosa multiflora initiated leaf growth earlier and retained leaves longer than canopy vegetation and tended to have higher photosynthetic rates in spring and fall. In the greenhouse, plants displayed shade-avoidance traits, decreasing relative growth rate and reducing branching, while increasing elongation and showing no change in light response curve parameters.
4.10	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. Steavenson, H. (1946). Multiflora Rose for Farm Hedges. The Journal of Wildlife Management, 10(3), 227-234. 3. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5]	1. Rosa multiflora grows best on deep, fertile, well-drained but moist uplands or bottomlands, but is capable of enduring a wide range of edaphic and environmental conditions 2. The vigor of the species on poor soil suggests low fertility requirements 3. It is most productive in sunny areas with well-drained soils.
4.11	1. PIER http://www.hear.org/pier/species/rosa_multiflora.htm (12-2-2016) 2. Minnesota Department of Agriculture http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist/multiflorarose.aspx (12-7-2016)	1. climbing shrub 2. The thorny, ridged stems tangle around one another and vine around smaller trees and shrubs to create impenetrable thickets that are extremely hard for humans and livestock to navigate through.
4.12	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. PIER http://www.hear.org/pier/species/rosa_multiflora.htm (12-2-2016) 3. Jesse, L. C., Moloney, K. A., & Obrycki, J. J. (2006). Insect pollinators of the invasive plant, Rosa multiflora (Rosaceae), in Iowa, USA. Weed Biology and Management, 6(4), 235-240.	1. The plant is extremely prolific, however, and successfully invades pastures and other unplowed lands, crowding out existing vegetation and creating dense, impenetrable thickets. In some areas entire pastures have been taken over 2. The shrub forms impenetrable and large thickets out-competing native species, preventing forest regeneration and degrading grasslands 3. Rosa multiflora Thunb. (Rosaceae) currently infests 45 million acres (18.2 million ha) in the eastern half of the USA, reducing the value of land for grazing or recreational purposes because dense patches of the plant are impassable and are not utilized by most livestock
5.01		Family: Rosaceae
5.02		Family: Rosaceae
5.03		Family: Rosaceae
5.04	1. Encyclopedia of Life http://eol.org/pages/630393/details (12-2-2016)	no evidence of these features
6.01		no evidence
6.02	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. PIER http://www.hear.org/pier/species/rosa_multiflora.htm (12-2-2016) 1. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5]	1. Rosa multiflora reproduces by seeds and by rooting at the tips of its drooping canes 2. Propagation: Seed and vegetative layering 3. Seeds may remain viable in the soil for 10 to 20 years
6.03		lack of evidence

6.04	1. Jesse, L. C., Moloney, K. A., & Obrycki, J. J. (2006). Insect pollinators of the invasive plant, Rosa multiflora (Rosaceae), in Iowa, USA. Weed Biology and Management, 6(4), 235-240.	1. obligate outcrosser
6.05	1. Jesse, L. C., Moloney, K. A., & Obrycki, J. J. (2006). Insect pollinators of the invasive plant, Rosa multiflora (Rosaceae), in Iowa, USA. Weed Biology and Management, 6(4), 235-240. 2. Banasiak, S. E., & Meiners, S. J. (2009). Long term dynamics of Rosa multiflora in a successional system. Biological Invasions, 11(2), 215-224. 3. MacPhail, V. J., & Kevan, P. G. (2005, September). Reproductive success and insect visitation in wild roses (Rosa spp.)-Preliminary results from 2004. In IV International Symposium on Rose Research and Cultivation 751 (pp. 381-388).	1. European honey bees, Apis mellifera (Hymenoptera: Apidae), bumble bees, Bombus spp. (Hymenoptera: Apidae), and syrphid flies (Diptera: Syrphidae) have been observed visiting R. multiflora flowers on other continents. For example, Bombus spp., A. mellifera, and the syrphid fly, Syrphus ribesii, visited R. multiflora flowers in the Netherlands. Presumably, these insects are involved in the natural pollination of R. multiflora in Europe. In Korea, part of the home range of R. multiflora, A. mellifera was the major pollinator of R. multiflora... Results indicate that similar species of pollinating insects visit R. multiflora in Iowa compared to other continents. The two most common pollinators we observed visiting flowers were Syrphidae (hover flies) and A. mellifera, followed by other species of flies. 2. Rosa multiflora is pollinated by generalist insect pollinators 3. specialist pollinators not required
6.06	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. PIER http://www.hear.org/pier/species/rosa_multiflora.htm (12-2-2016) 3. Forest Invasive Plants Resource Center Rosa Multiflora http://na.fs.fed.us/spfo/invasiveplants/factsheets/pdf/multiflora-rose.pdf (12-5-2016)	1. Rosa multiflora reproduces by seeds and by rooting at the tips of its drooping canes 2. Propagation: Seed and vegetative layering 3. Multiflora rose reproduces by seed and suckering, as well as by branch tips that root upon contact with soil.
6.07	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf	1. Seedlings appear within 60 days at soil temperatures above freezing. Seedlings are generally inconspicuous the first one or two years due to their low growth habit
7.01	1. Forest Invasive Plants Resource Center Rosa Multiflora http://na.fs.fed.us/spfo/invasiveplants/factsheets/pdf/multiflora-rose.pdf (12-5-2016) 2. Minnesota Department of Agriculture http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist/multiflorarose.aspx (12-7-2016) 3. Plant Conservation Alliance Alian Plant Working Group https://www.nps.gov/plants/alien/fact/romu1.htm (12-12-2016)	1. It is found along stream banks, pastures, roadsides, savannas, forest edges and open woodlands. 2. Multiflora rose is typically found in forest understories and clearings, hedgerows, savannas, stream banks, wetland and bog edges, pastures, abandoned fields, urban woodlots, roadsides, and other disturbed habitats. 3. It occurs in dense woods, prairies, along stream banks and roadsides and in open fields and pastures.
7.02	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. Steavenson, H. (1946). Multiflora Rose for Farm Hedges. The Journal of Wildlife Management, 10(3), 227-234. 3. Minnesota Department of Agriculture http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist/multiflorarose.aspx (12-7-2016)	1. Its spread in the USA was deliberately encouraged by the US Soil Conservation Service from the 1930s to 1960s, when it was widely planted as a wildlife plant for erosion control and as a hedge 2. A 1946 paper recommending Rosa Multiflora for use as a living fence or hedge and detailing its testing for this purpose in some states. 3. This species was introduced to North America as a rootstock for ornamental roses and also used for erosion control, living fence rows and wildlife habitat.
7.03		no evidence
7.04		no evidence
7.05		no evidence
7.06	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. Banasiak, S. E., & Meiners, S. J. (2009). Long term dynamics of Rosa multiflora in a successional system. Biological Invasions, 11(2), 215-224. 3. Jesse, L. C., Nason, J. D., Obrycki, J. J., & Moloney, K. A. (2010). Quantifying the levels of sexual reproduction and clonal spread in the invasive plant, Rosa multiflora. Biological invasions, 12(6), 1847-1854.	1. Birds eat the seeds and are responsible for its dispersal, rose seedlings are often found under bird perch sites 2. Its seeds are bird dispersed 3. seeds dispersed primarily by birds and rodents
7.07	1. Encyclopedia of Life http://eol.org/pages/630393/details (12-2-2016)	no evidence of mechanism for attachment

7.08	1. Jesse, L. C., Nason, J. D., Obrycki, J. J., & Moloney, K. A. (2010). Quantifying the levels of sexual reproduction and clonal spread in the invasive plant, Rosa multiflora. Biological invasions, 12(6), 1847-1854. 2. Forest Invasive Plants Resource Center Rosa Multiflora http://na.fs.fed.us/spfo/invasiveplants/factsheets/pdf/multiflora-rose.pdf (12-5-2016) 3. Minnesota Department of Agriculture http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist/multiflorarose.aspx (12-7-2016)	1. 16.4% of seeds found in bird excrement collected in traps placed under artificial saplings were from R. multiflora. 2. Mammals such as deer mice also feed on the fruits. Seed germination is enhanced from passing through animal digestive tracts. 3. Multiflora rose grows and spreads aggressively by producing high numbers of viable seeds that are consumed by birds or small mammals and distributed to new areas.
8.01	1. https://www.nps.gov/plants/alien/pubs/midatlantic/romu.htm (accessed 3/23/2017)	1. An average plant produces an estimated one million seeds per year,
8.02	1. Banasiak, S. E., & Meiners, S. J. (2009). Long term dynamics of Rosa multiflora in a successional system. Biological Invasions, 11(2), 215-224. 2. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5]	1. Rosa multiflora seeds can remain viable in the soil for over 20 years 2. Seeds may remain viable in the soil for 10 to 20 years
8.03	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5] 3. The New York Invasive Species Clearinghouse, Cornell University Cooperative Extension http://nyis.info/index.php?action=invasive_detail&id=33 (12-12-2016)	1. The most effective means of eradication seem to be cutting followed by herbicide application. Glyphosate is commonly used and can be effectively applied in a 1% V/V solution, or 0.5% V/V solution if a surfactant is added, applied directly to the plants, cut branches, or stumps. Spring applications should show increasing control over the season with complete residual control the following spring. Repeat applications may be necessary in subsequent years to prevent recurrences. 2. Foliar spraying is effective throughout the growing season as long as leaves are fully formed. Some variation in herbicide effectiveness during different stages of the growing season has been observed 3. Herbicides have been used successfully in controlling mulitflora rose but, because of long lived stores of seed in the soil, follow up treatments are likely to be necessary.
8.04	1. Glasgow, L. S., & Matlack, G. R. (2007). The effects of prescribed burning and canopy openness on establishment of two non-native plant species in a deciduous forest, southeast Ohio, USA. Forest Ecology and Management, 238(1), 319-329. 2. Missouri Department of Conservation: Multiflora Rose Control https://mdc.mo.gov/trees-plants/problem-plant-control/invasive-plants/multiflora-rose-control (12-12-2016)	1. Seedling growth of R. multiflora was greatest following high-intensity fire under canopy gaps. 2. Pulling, grubbing or removing individual plants from the soil can only be effective when all roots are removed or when plants that develop subsequently from severed roots are destroyed... Pruning of multiflora rose will encourage growth
8.05	1. Eckardt N, Martin TL, 2001. Rosa multiflora. The Nature Conservancy, Element Stewardship Abstract. http://invasive.org/gist/esadocs/documnts/rosamul.pdf 2. Munger, Gregory T. 2002. Rosa multiflora. 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/ [2016, December 5]	1. The European Rose chalicid, Megastigmus aculeatus Swederus (Hymenoptera:Torymida), and rose rossette disease are potential biological control agents for multiflora rose. 2. Multiflora rose is often severely impacted by rose rossette disease where their ranges overlap. The disease agent and the mite vector are native to North America.