Forest Service, US Department of Agriculture
Northern Research Station

# An Assessment of Multiflora Rose in Northern U.S. Forests

Research Note NRS-182

This publication provides an overview of multiflora rose (*Rosa multiflora*) on forest land across the 24 states of the midwestern and northeastern United States based on an extensive systematic network of plots measured by the Forest Inventory and Analysis (FIA) program of the U.S. Forest Service, Northern Research Station (NRS).

## Background and Characteristics

Multiflora rose was introduced in 1866 to the eastern United States from Japan by the rose industry (Kaufman and Kaufman 2007). It was promoted as a plant for erosion control, as a living fence, rootstock for ornamental roses, and crash and snow barrier (Czarapata 2005, Kaufman and Kaufman 2007). Multiflora rose was also planted for wildlife, forming dense thickets that offer shelter for birds and small mammals.

Multiflora rose grows most vigorously in full sun but it can also survive in the shade of the forest interior. Where multiflora rose establishes, it often forms dense thickets (Fig. 1) that restrict the growth of other vegetation and reduce available site resources (e.g., light and nutrients). This vigorous plant has large, prolific thorns which are hazardous to both humans and livestock.

Multiflora rose can reduce land value and it is difficult to manage. This noxious shrub can produce 1 million seeds per year that remain viable for up to 20 years (Czarapata 2005, Kaufman and Kaufman 2007). In addition, the stems of the plant (known as canes) are able to root at the spot where the canes contact the ground, a process called layering.


**Figure 1.--Multiflora rose bush.** (James H. Miller, USDA Forest Service, Bugwood.org)


**Figure 2.--Fruit of multiflora rose.** (Leslie J. Mehrhoff, University of Connecticut, Bugwood.org **)**

## Description

**Growth form:** woody shrub up to 15 feet tall and 13 feet wide.
**Leaves:** 5 to 11 leaflets with uniquely fringed petioles which differentiate this species from most other roses.
**Flowers:** ½- to 1-inch wide, occurring in clusters with five white to slightly pink petals that bloom in spring.
**Fruit:** small, rounded, red hips (Fig. 2) that persist on the plant into winter.
**Habitat:** tolerates a wide range of conditions; occurring in pastures, forests, fields, and along roadways.
**Growth limitations:** extremely wet and dry sites, temperatures below -28 °F, and requires cold stratification (a cold treatment to break dormancy and begin germination).
**Control:** various mechanical, biological, and chemical methods (Czarapata 2005, Kaufman and Kaufman 2007).

## Range

Multiflora rose is currently found in 39 states and five Canadian provinces (Fig. 3).

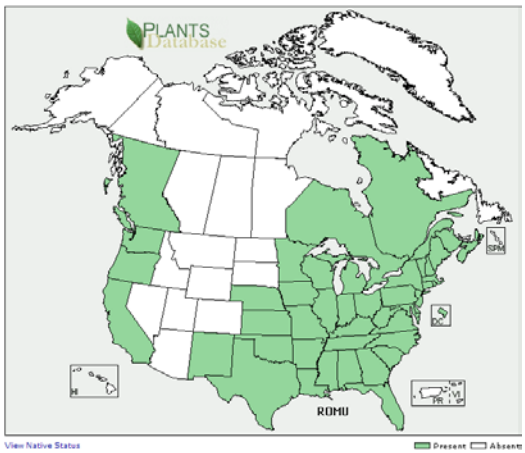


**Figure 3.--Multiflora rose presence, U.S. and Canada.** (NRCS 2013)

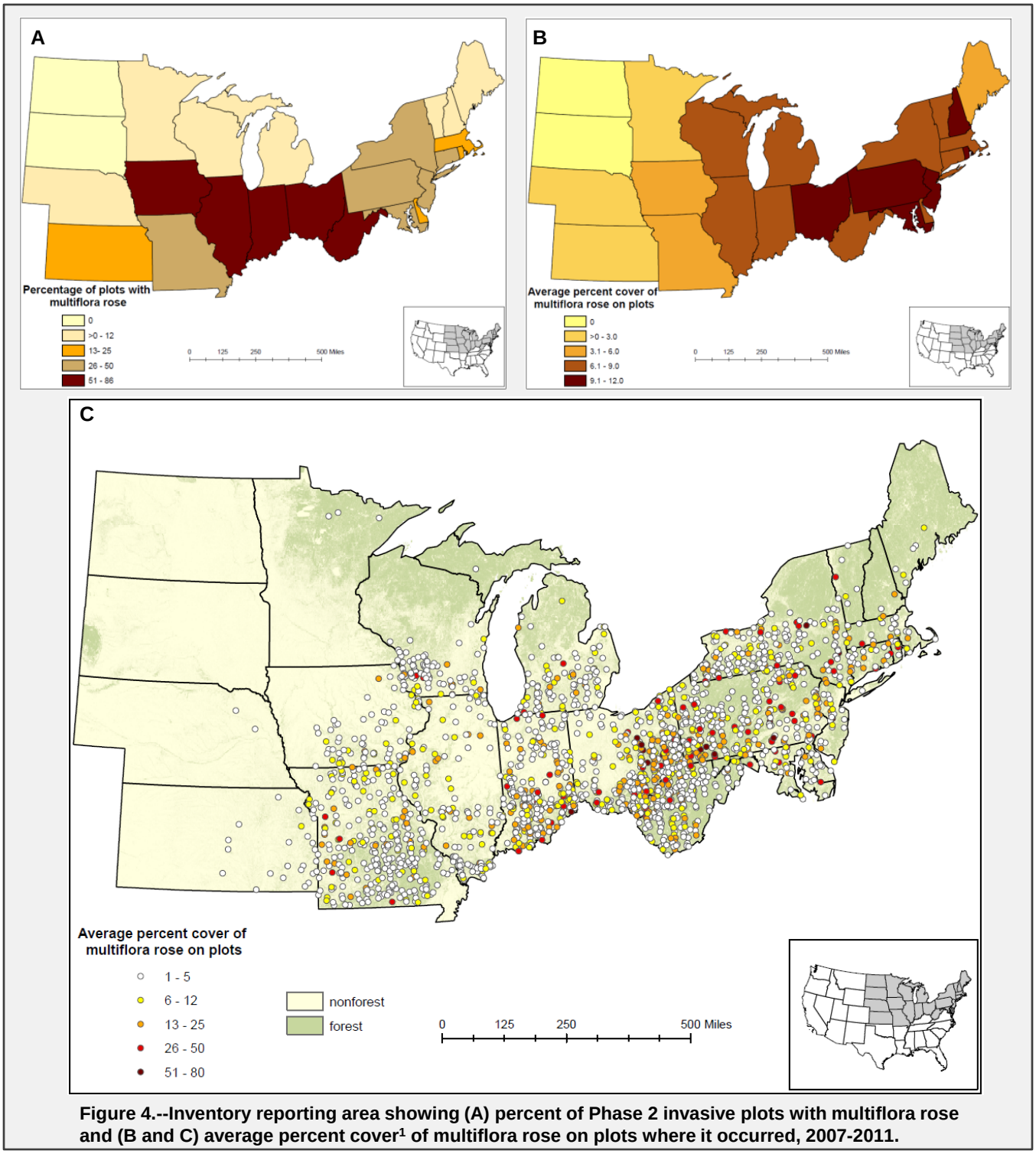


**Figure 4.--Inventory reporting area showing (A) percent of Phase 2 invasive plots with multiflora rose and (B and C) average percent cover[1] of multiflora rose on plots where it occurred, 2007-2011.**

Multiflora rose is present in 22 of the 24 states in the NRS region (Fig. 4A), with plots in the southeastern part of the region having the highest cover (Fig. 4B and 4C). Between 2007 and 2011, FIA crews visited 8,769 forested field plots across the region that were examined for many attributes, including the occurrence and coverage of multiflora rose and other invasive plant species. Of these forested plots, multiflora rose was found on 2,169 plots (24.7 percent). A county level map of multiflora rose presence in the NRS region from 2005 through 2010 is shown in Kurtz (2013).

[1]Average percent coverage is based on subplot data and is calculated for only the subplots where the species is present. Each FIA plot consists of four circular 1/24-acre subplots located at the corners and center of an equilateral triangle that is 208 feet on a side.

Multiflora rose was most commonly observed on forest land near roads. There is a significant difference ($p<0.05$) in average road distance between plots with and without multiflora rose (Fig. 5). These findings illustrate the importance of managing lands to preserve intact forest land. Roads, one indicator of forest fragmentation, were also found to be important predictors of invasive plants by Lundgren et al. (2004) and Predick and Turner (2008). When roads are created, they disturb the landscape by altering light, drainage, competition, and the level of anthropogenic influence (Fig. 6).

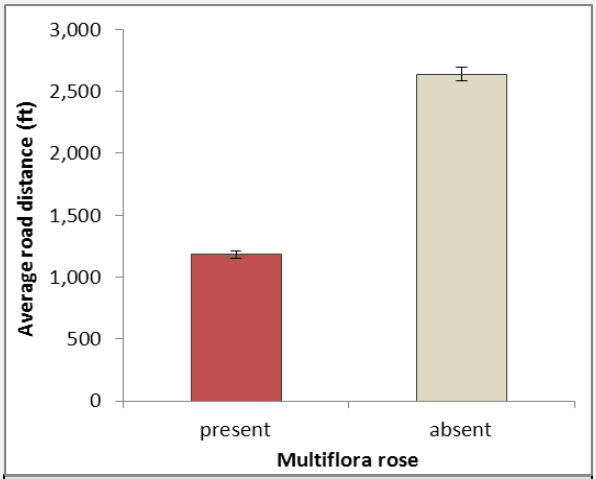


**Figure 5.--Average distance to the nearest road for plots with or without multiflora rose, 2007-2011.**


**Figure 6.--Multiflora rose along a roadway. (Randy Westbrooks, U.S. Geological Survey, Bugwood.org).**

Regeneration of oak seedlings may also be affected by multiflora rose (Fig. 7). Looking at forested plots that were at least 75 percent oak-hickory forest type, we found that in stands where the oak overstory was low (BA of oak trees ≥5 inches diameter at breast height [d.b.h.] from 0 to 60 $ft^2$/ac) there were significantly fewer oak seedlings per acre in stands with multiflora rose than in stands where multiflora rose was not observed ($p<0.05$). In stands where the basal area of oak overstory was greater than 60 $ft^2$/ac, the difference was not significant. The higher basal area classes may not be showing an effect from the multiflora rose because of the limited resources available (such as sunlight and nutrients) that restrict the growth of the oak seedlings. In the low basal area classes, the multiflora rose plants may be outcompeting the oak seedlings. These findings offer valuable information on the effect of multiflora rose within the forest, suggesting this invasive shrub may be suppressing oak regeneration in oak-hickory stands of low basal area. Its effect on oak regeneration is of concern as oaks have high aesthetic, timber, and wildlife value.

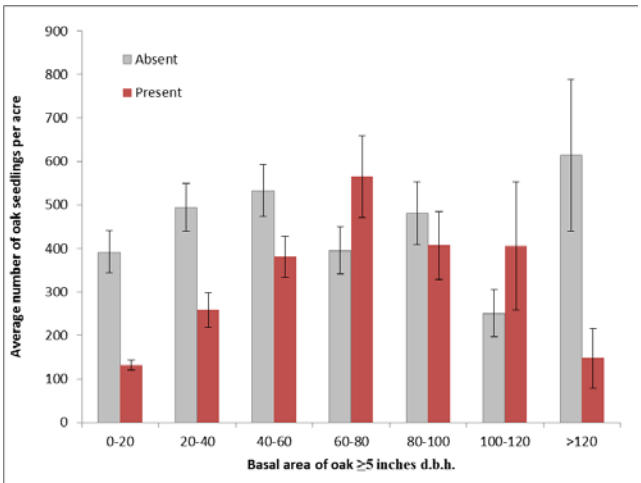


**Figure 7.--Average number of oak seedlings per acre in oak-hickory forest type by oak basal area class (≥5 inches d.b.h. ) for stands with and without multiflora rose.**

The effect of invasive plant species on regeneration is important as these plants are competing with and replacing native tree seedlings in the understory. It is necessary to have sufficient regeneration to replace the aging overstory within the forest. In the future, remeasurement of these plots will provide added information on trends that are occurring within the forest and further explain how invasive plant species are affecting regeneration.

*Note: the error bars in figures 5, 7, 9, and 10 show a 68 percent confidence interval for the observed mean.

## What Have We Found on Remeasured Plots in the North-Central Region?

For 11 states in the north-central region of the United States (Fig. 8), 1,814 plots had invasive plant data collected on them in 2005 and 2006 and were remeasured in 2010 and 2011. We found the presence of multiflora rose increased during this period. In 2005 and 2006, 259 plots (14.3 percent) had multiflora rose present, this number increased to 355 plots (19.6 percent) in 2010 and 2011. Two hundred and thirty-three plots (12.8 percent) had multiflora rose present in both inventories.

Plots with multiflora rose had a significantly lower proportion of the plot that was forested (Fig. 9) and more invasive plant species (of the 18 plants monitored in both inventories[2]; $p<0.05$; Fig. 10). Future data to be collected across the 24 states monitored by the NRS-FIA will assess the spread of many important invasive plant species in this region. This is important as the presence of invasive plant species can reduce property values, biodiversity, habitat quality, and sustainability.

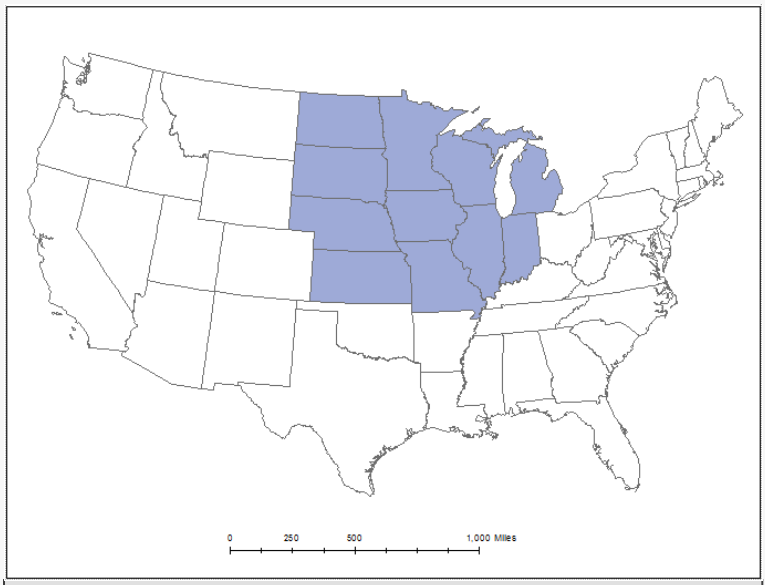


**Figure 8.--The 11 states of the north-central region where invasive plants were measured in 2005-2006 with remeasurement in 2010-2011.**

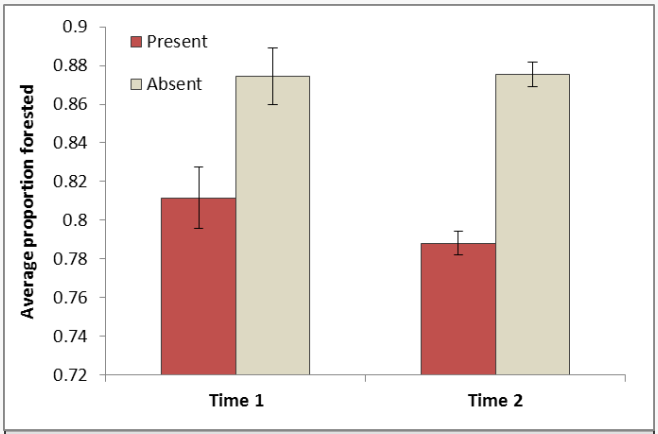


**Figure 9.--Average proportion of the plot that is forested for plots with or without multiflora rose at time 1 (2005-2006) and time 2 (2010-2011), north-central region.**

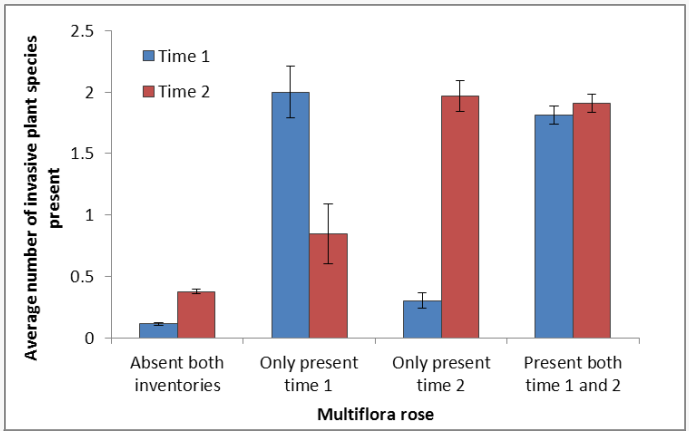


**Figure 10.--Average number of invasive plant species present (of those monitored in 2005-2006 and 2010-2011[2]) on forested plots with or without multiflora rose at time 1 (2005-2006) and time 2 (2010-2011), north-central region.**

[2]The invasive plants monitored in both inventories (2005-2006 and 2010-2011) were: Japanese barberry (*Berberis thunbergii*), garlic mustard (*Alliaria petiolata*), spotted knapweed (*Centaurea stoebe* L. ssp. *micranthos*), Oriental bittersweet (*Celastrus orbiculatus*), Louise's swallowwort (*Cynanchum louiseae*), autumn olive (*Elaeagnus umbellata*), leafy spurge *(Euphorbia esula*), glossy buckthorn (*Frangula alnus*), dames rocket (*Hesperis matronalis*), European privet (*Ligustrum vulgare*), Japanese honeysuckle (*Lonicera japonica*), nonnative bush honeysuckles (*Lonicera* spp.), Nepalese browntop (*Microstegium vimineum*), reed canarygrass (*Phalaris arundinacea*), common reed (*Phragmites australis*), Japanese knotweed (*Polygonum cuspidatum*), common buckthorn (*Rhamnus cathartica*), and multiflora rose (*Rosa multiflora*).

## Citation for this Publication

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## FIA Program Information

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## References

Czarapata, E.J. 2005. **Invasive plants of the upper Midwest: an illustrated guide to their identification and control.** Madison, WI: The University of Wisconsin Press. 215 p.

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## Additional Invasive Plant Information

Alien Plant Invaders of Natural Areas (PCA, National Park Service): http://www.nps.gov/plants/alien/factmain.htm
Invasive and Exotic Plants: http://www.invasive.org/species/weeds.cfm
Invasive Plant Atlas of New England: http://www.eddmaps.org/ipane/
Invasive Plant Atlas of the United States: http://www.invasiveplantatlas.org/index.html
Midwest Invasive Plant Network: http://mipn.org/

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