

Invasive species trends in Northeast Temperate Network park forests

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Introduction

The Northeast Temperate Network (NETN) has been monitoring forest health in a network of permanent forest health plots spanning eight northeastern national parks since 2006 (Fig. 1). Permanent plots are randomly located and are sampled on a 4-year rotation. Currently each plot has been sampled at least 3 times. Here we present preliminary results from trend analyses of invasive plant species across network parks.

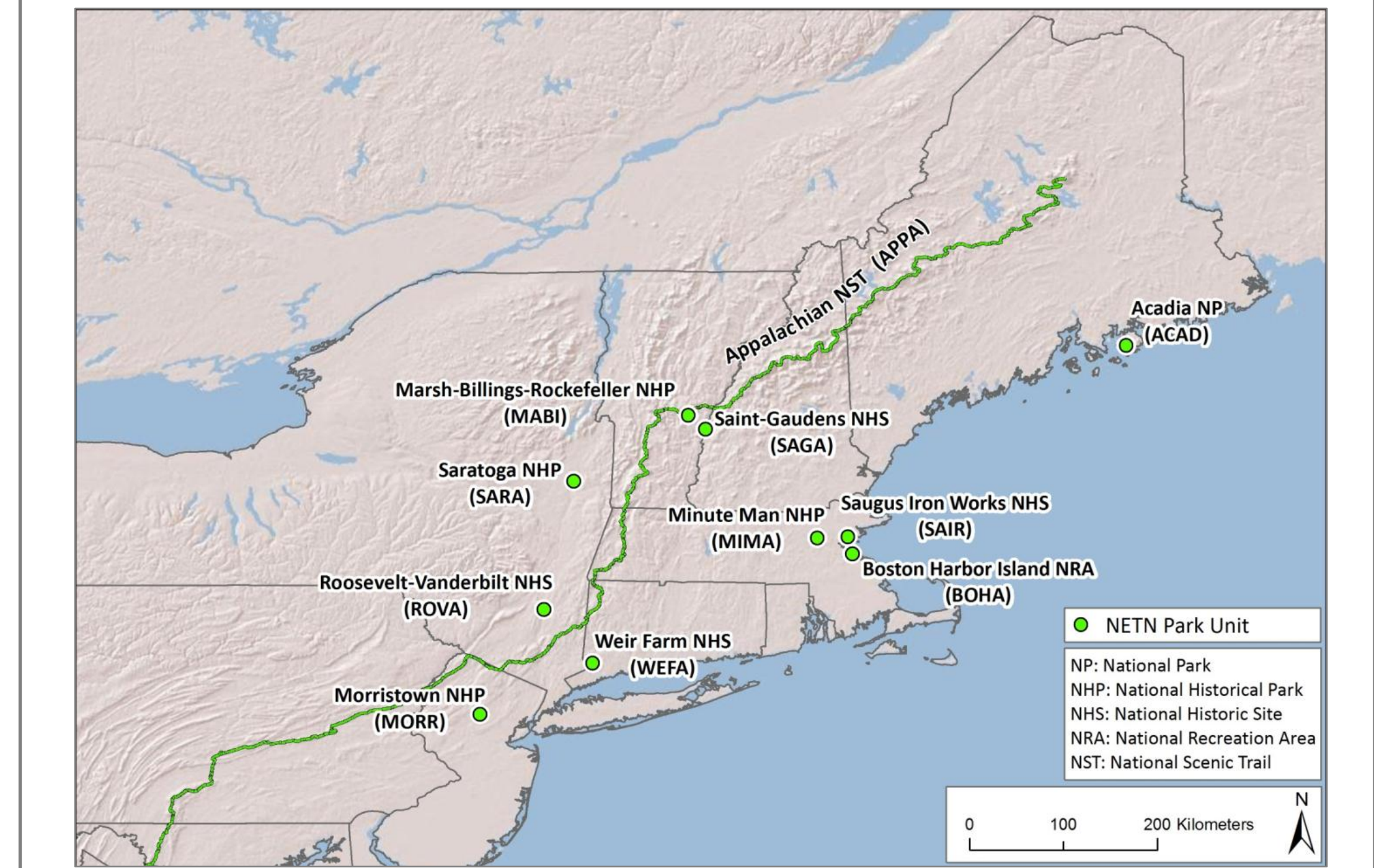


Figure 1. Northeast Temperate Network parks

Methods

We are using generalized linear mixed effects modeling to determine how invasive plants are changing over time and by guild for the following metrics:

- Plot frequency:** proportion of plots per park with an invasive species present.
- Quadrat frequency:** average number of 1m² quadrats with an invasive species present per plot (Fig. 2).
- Quadrat % cover:** average percent cover of invasive species in 1m² quadrats.
- Species richness:** average number of invasive species present in quadrats.

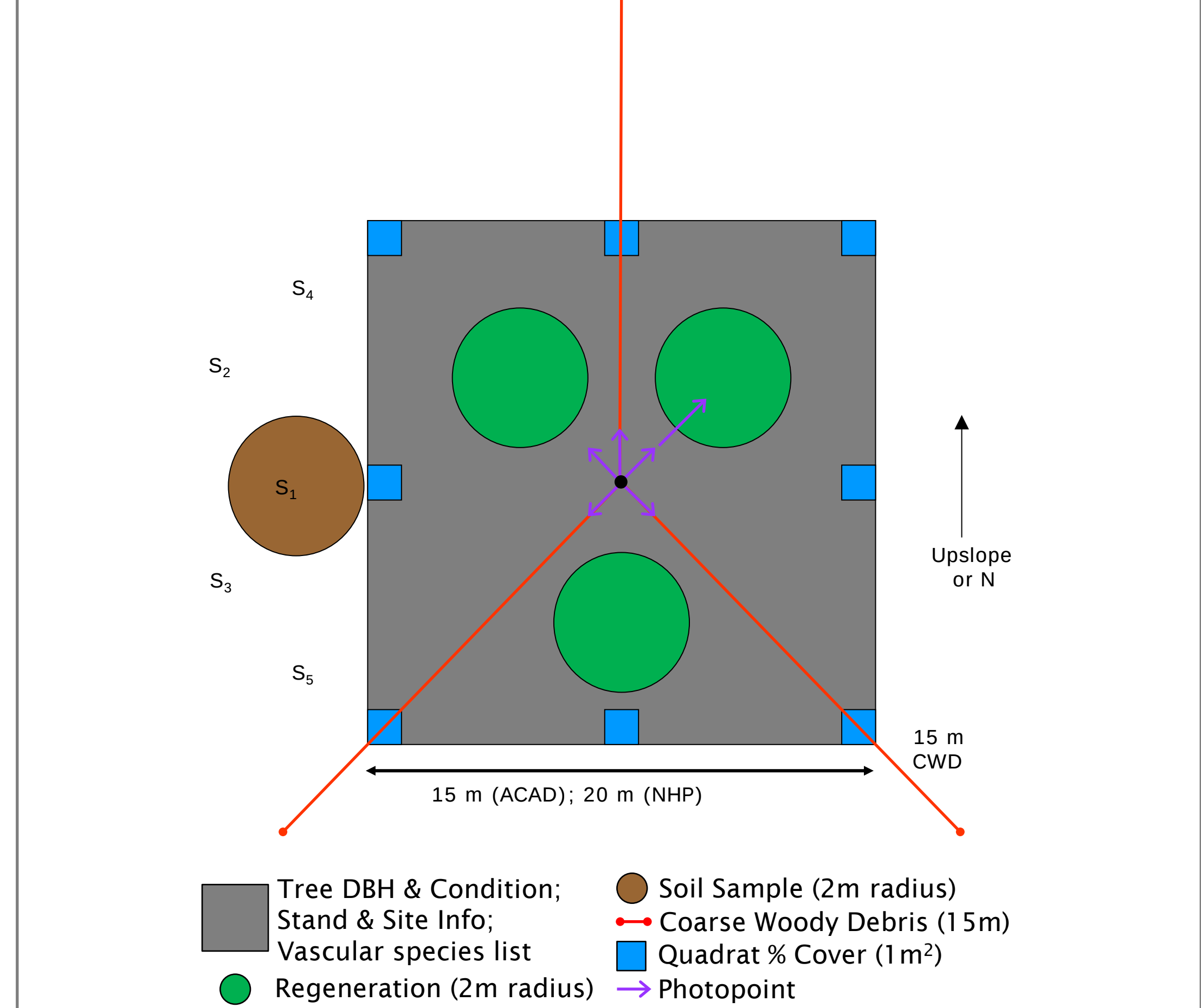


Figure 2. Diagram of NETN forest health plot.

Results

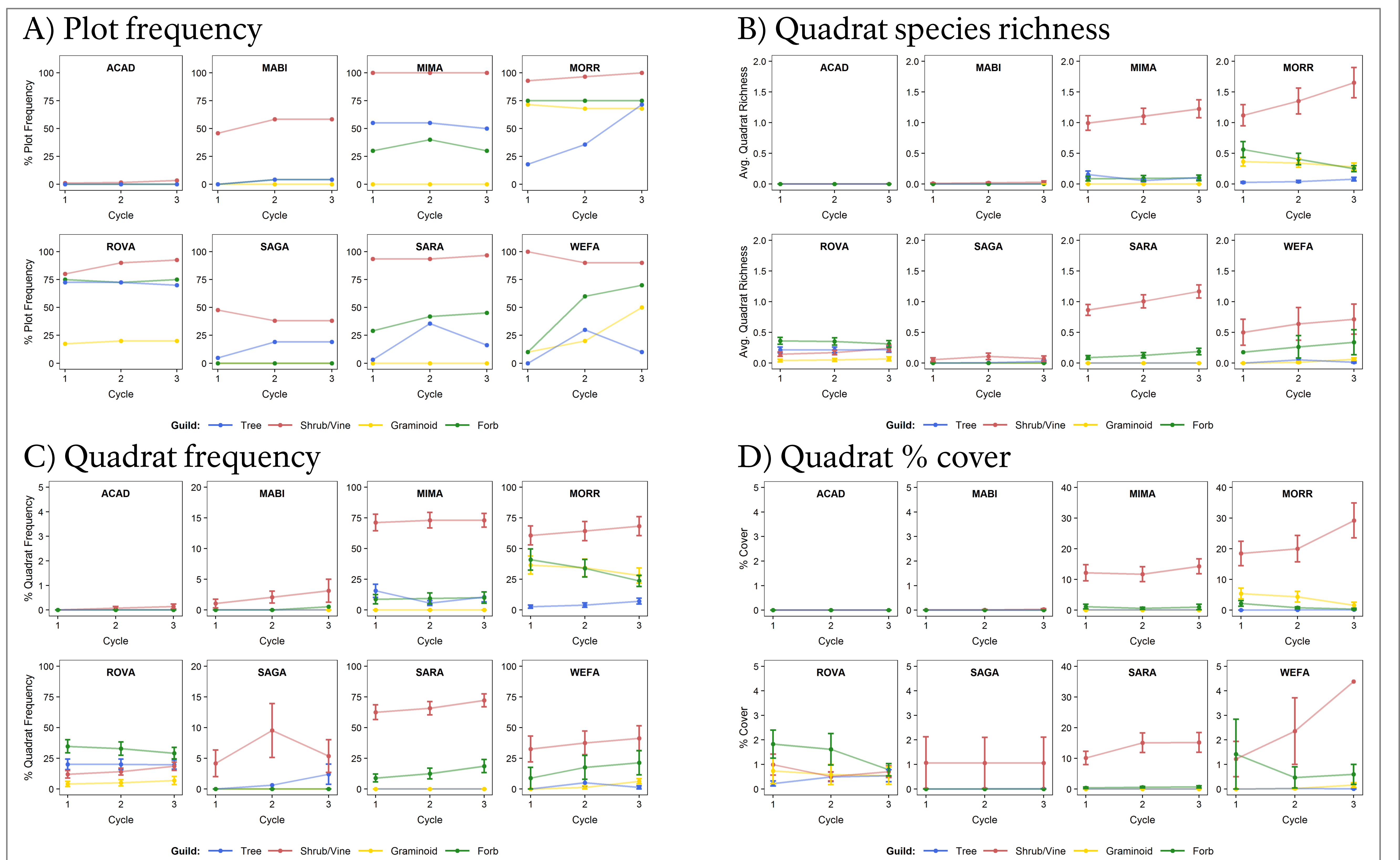


Figure 3. Trends in invasive plants by guild for NETN parks. Cycle 1 was 2007-2010; cycle 2 was 2011-2014; cycle 3 was 2015-2018. Shrub/Vine are species that are woody, but that are not capable of forming a forest canopy like trees. Graminoids are grasses, sedges and/or rushes. Forbs are non-graminoid herbaceous species. Error bars represent ± 1 SE.

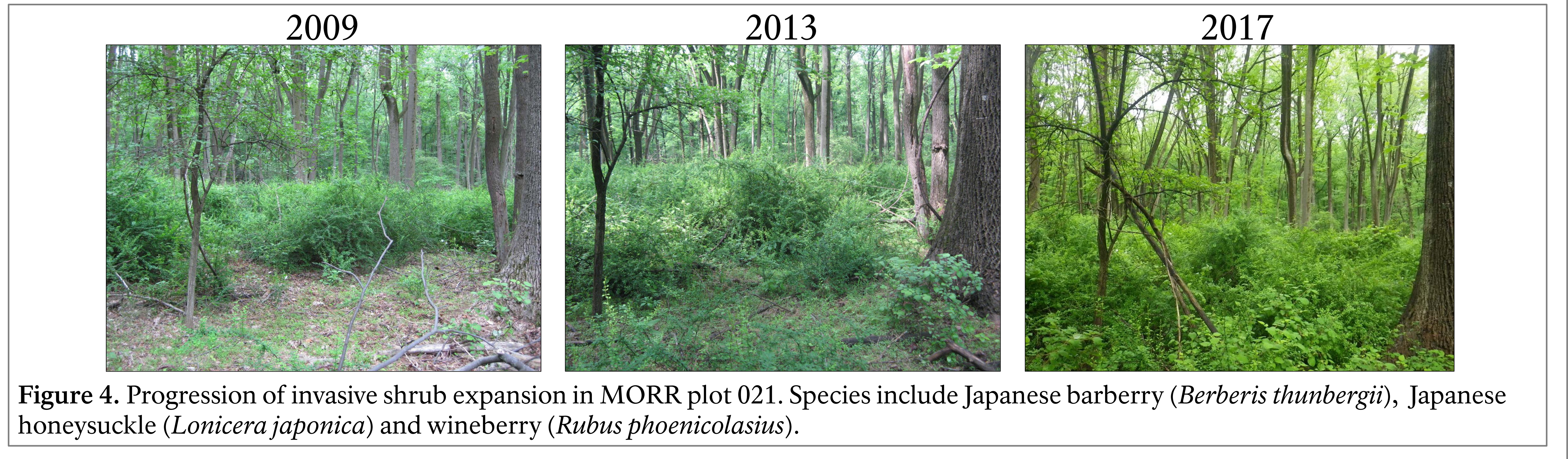


Figure 4. Progression of invasive shrub expansion in MORR plot 021. Species include Japanese barberry (*Berberis thunbergii*), Japanese honeysuckle (*Lonicera japonica*) and wineberry (*Rubus phoenicolasius*).

Conclusions

- Across nearly all parks and all scales, invasive shrubs/vines consistently increased in abundance over time (Fig. 3).
- These trends were especially strong in parks with chronic overabundant deer populations, like SARA and MORR (Fig. 4).
- Eradicating invasive shrubs, such as Japanese barberry, glossy buckthorn (*Frangula alnus*) and exotic bush honeysuckle (*Lonicera* spp.) should be a high management priority, especially in parks where these species are currently present at low levels.

For more information

NETN forest health monitoring website:
<https://www.nps.gov/im/netn/forest-health.htm>

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