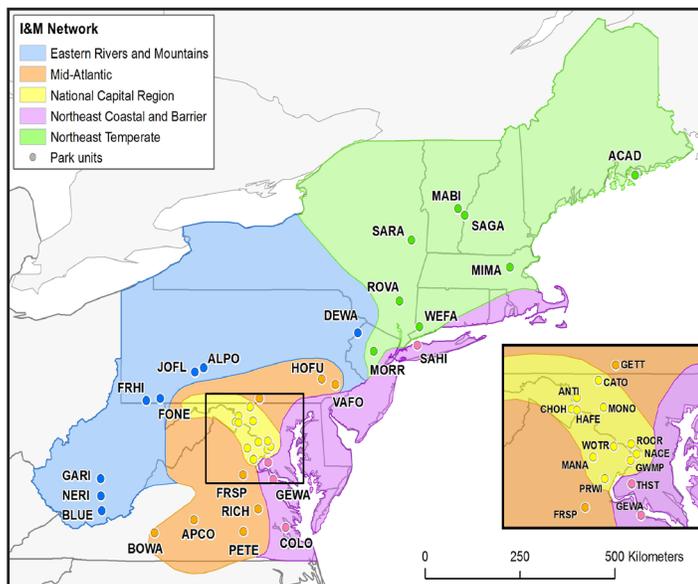




Invasive Plants: An Ever Growing Problem

Invasive plant species are a large and growing problem for national parks and natural areas. They reduce native diversity, alter forest structure, suppress tree regeneration, and alter nutrient cycling among other negative impacts. The high abundance of invasives being found in many eastern parks may be surprising: aren't parks supposed to be more pristine than unprotected areas? While true eastern parks are regionally significant in having older forest structure and a higher tree diversity than surrounding forests, their borders don't protect them from invasives. The impacts from invasive plants are leading to changes in the make-up and functionality of park forests. Long-term NPS I&M forest monitoring is uncovering some new and key findings. It is uniquely situated to examine trends in invasive plant communities spanning a broad region using over a decade of consistently collected data.



Parks in this study span five I&M networks.

Invasive Plants in Marsh-Billings-Rockefeller NHP

Status: In the most recent 2015-2018 monitoring cycle, at least one invasive species was detected in about 9 out of 10 plots. Herbaceous (non-woody stemmed) plants were the most abundant, found in about 70% of plots. The most abundant was broadleaf heleborine (*Epipactus helleborine*), occurring in 58% of plots. Fortunately it does not yet appear to have invasive tendencies in the park. European buckthorn (*Rhamnus cathartica*), a highly invasive species, was the most abundant shrub, occurring in 25% of plots. Japanese barberry (*Berberis thunbergii*), exotic bush honeysuckle

(*Lonicera*), and dame's rocket (*Hesperis matronalis*) were also fairly common.

Trends: Unlike the majority of NETN parks, no significant increases in total invasive plants were found from 2006-2018 for invasive plants (grasses, shrubs, herbs). In fact, this park was one of the few in the study that only detected significant *decreases*, likely the result of the park's persistent invasive management efforts. For example, European barberry (*Berberis vulgaris*) was nearly 3 times less likely to occur in a plot from one cycle to the next.

A Regional Perspective: Invasive Plants Keep Expanding

Any way you slice it, trying to slow/reverse the spread of invasive plants is a daunting task that looks to only become more challenging in the coming years and decades. Across the region, invasive plants overwhelmingly increased during the span of this study - even in parks already heavily invaded when data was first collected in 2006. Managing invasive plants is a complex process influenced by many overlapping and compounding factors. Invasives are relentless - they respond rapidly to disturbances and many are well-suited to take advantage of our warming climate with its earlier springs. Park managers are struggling to curb pathways of invasion (some, like birds distributing seeds are near impossible to stop). There are current and legacy effects from deer and other invasives

(i.e. earthworms) that will take many years or even decades to play out or mitigate.



FINDING: Japanese stiltgrass is widespread and continues to rapidly increase in abundance

This finding was concerning, as no other study to date has documented such a rapid invasion rate over such a time-period (12 years). Japanese stiltgrass (*Microstegium vimineum*) can expand rapidly and maintain a high abundance for at least a decade, especially where invasive shrubs are not also present. Speaking of which:



FINDING: Invasive shrubs can increase at the expense of other invasive plant species

Interactions between invasives have not been well studied. This study found that even where there were significant declines in an invasive species, they were



Japanese stiltgrass can carpet the forest floor and suppress forest diversity.

often countered by a roughly equivalent increase in different invasive plant species. One such interaction between invasives was observed at Appomattox Court House NHP in Virginia, where average cover of Japanese stiltgrass significantly increased over time while Japanese honeysuckle significantly decreased. Despite this example, invasive shrubs were much more likely to increase at the *expense* of Japanese stiltgrass in this study, a finding unduplicated in other available research results.

MANAGEMENT ADVICE: Japanese stiltgrass and invasive shrubs should be the highest management priorities in eastern forests

Japanese stiltgrass was the most aggressive invasive in the study area, particularly in the mid-Atlantic region. Japanese stiltgrass suppresses tree regeneration and understory diversity and detecting/controlling it should be a top priority.

Invasive shrubs too are very common and the fastest increasing invasives group in the northeastern region. In addition to impacting tree regeneration and understory diversity, invasive shrub thickets have been shown to support high densities of black-legged ticks with higher incidences of Lyme disease.

FINDING: We need to better understand invasive species drivers and impacts in eastern forests

This study was not well-equipped to assess the impacts of invasive trends on native species, nor examine the drivers behind them. Several studies have documented associations between too many deer (a chronic issue for many parks in this group),

invasive plant species, and impacts to native species. Over-abundant deer can encourage the spread of invasive species through dispersal, the browsing of native plants, and soil compaction and parks should manage invasives and deer together when possible. Japanese stiltgrass abundance and expansion in particular have been associated with high deer densities, a pattern found in many parks of this study. Now that the species and groups with the greatest invasive potential have been identified, we can begin to examine underlying drivers to

better predict invasive plant trends in the presence of stressors and help

managers reduce the further spread of invasives.

This invasive trends study did not consider how existing invasive management efforts explain the trends observed in our parks. Quantifying management efforts consistently across parks poses a considerable challenge. A large part of the equation to help with this is a more consistent, standardized method of reporting invasive plant management from parks. Where, when treatments are being made, and what is being targeted can then be better documented and incorporated into studies such as this one.

CONCLUSION: invasives are a growing problem in eastern parks and there is an urgent need for long-term resources to manage them

The high and often increasing abundance of invasives in the majority of parks in this study poses significant threats to the long-term condition of their forests, and is in conflict with the mission of the National Park Service. While many parks actively manage invasives, few

“Just as the National Park Service is working to overcome a deferred maintenance backlog, deferred management of natural resources needs equal attention and sustained commitment to ensure the long-term health of forests in our national parks.”

in our region have the long-term resources needed to reduce the persistent, negative impacts of invasive plant species. Just as the National Park Service is working to overcome a deferred maintenance backlog for buildings, roads and other infrastructure, scientists involved in this study propose that deferred management of natural resources receive equal attention and sustained commitment to ensure the long-term health of forests in our national parks.

