

Forest Health in a Regional Context

HOW ARE OUR FORESTS DOING?

Understanding the condition of park natural resources is essential to making informed management decisions. However, when looking at raw data or statistics, it is hard to evaluate what those numbers tell us about park resources. For example, “Is 9,000 tree seedlings per hectare enough for the park’s forests to regenerate?” or “How bad is the exotic invasive species problem in this park?”

Putting raw data into context provides insight on how park resources are doing. Analyzing and comparing data from numerous parks lets managers assess how the forest condition at their parks compares to other parks in the region.

WHAT WE ARE DOING

Eight Inventory and Monitoring (I&M) networks have been collaborating on forest health monitoring since 2005. Participants include 61 national parks (23% of all parks in the I&M Program) in the eastern United States (Figure 1). As a result of this collaboration, vegetation data are collected in similar ways, which allows us to compare various parks across the region. Two examples of regional analyses that resulted from this collaboration are discussed below.

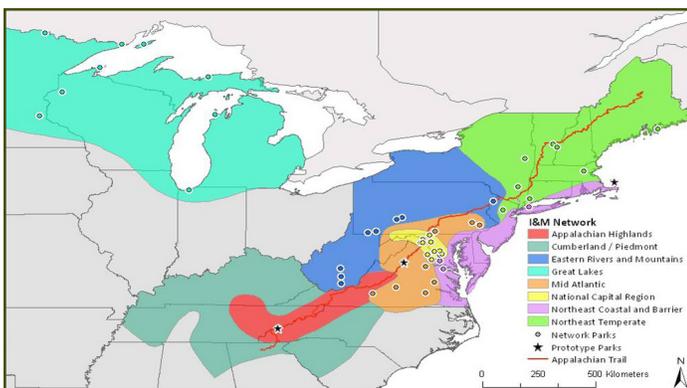


Figure 1. Inventory and Monitoring networks and parks participating in the regional collaboration. Graph Credit: K. Miller.

WHAT WE ARE FINDING

Exotic Invasive Plants

Exotic invasive plants pose a serious threat to many parks’ forests because they can outcompete native plants, suppress forest regeneration, degrade wildlife habitat, and affect soil fertility. The diversity and distribution of exotic invasive plants varies among Eastern Rivers and Mountains Network (ERMN) parks and other parks in the region (Figures 2 and 3). Some important comparisons include:

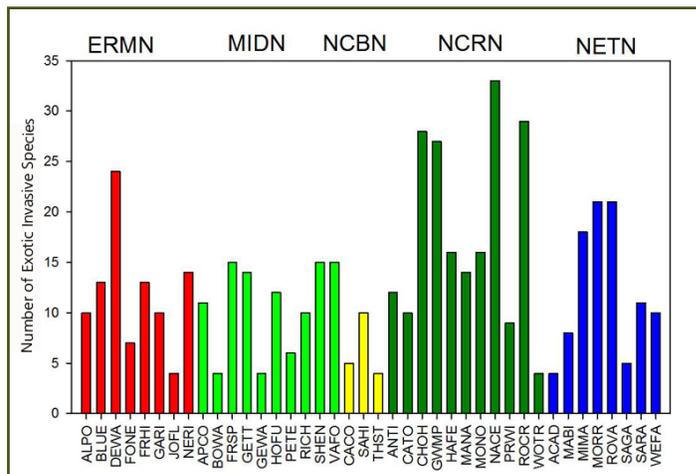


Figure 2. Number of exotic invasive plant species detected in forest monitoring plots between 2007 - 2010 in 40 national parks with comparable invasive sampling methods. Graph Credit: J.P. Schmit.

- Delaware Water Gap National Recreation Area (DEWA) forests contain more species of exotic invasive plants than most other parks in the region.
- Relatively few species of exotic invasive plants have been detected in forests at Johnstown Flood National Memorial (JOFL).
- Nearly all forest monitoring plots in Friendship Hill National Historical Site (FRHI) contain at least one exotic invasive plant species.
- Gauley River National Recreation Area (GARI) contains a lower percentage of plots with exotic invasive species than most other parks in the region.

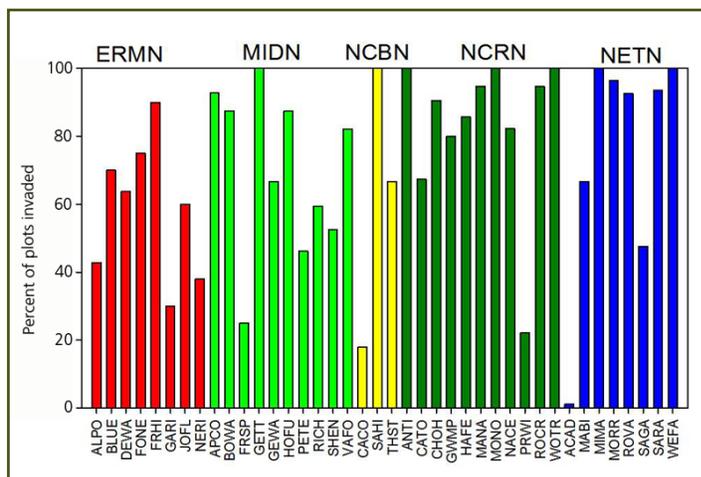


Figure 3. Percentage of forest monitoring plots that contained at least one exotic invasive plant between 2007 - 2010 in 40 national parks with comparable invasive sampling methods. Graph Credit: J.P. Schmit.



Forest Regeneration

The number of tree seedlings present on the forest floor is an important indicator of whether the forest can renew itself as older trees die. Seedling density in forest monitoring plots varies greatly among parks (Figure 4). In general, ERMN parks contain moderate densities of tree seedlings compared to other parks in the region. Friendship Hill National Historic Site, however, ranks in the lower 20th percentile of regional parks. None of the ERMN parks contain 14,000 seedlings / hectare, a target seedling density suggested by the U.S. Forest Service for forests with low deer browse pressure.

In ERMN parks, tree regeneration is strongly influenced by elevation, fern cover, grass cover, and number of stems of indicator plants sensitive to deer browse. In general, forests at higher elevation contain more regeneration. At sites with greater than 20% fern cover, tree regeneration decreases with greater fern cover. Similarly, as the cover of grasses increases, the amount of tree regeneration decreases. Sites with greater numbers of stems of herbaceous plants sensitive to deer browse contain more tree regeneration.



Collecting forest monitoring data in New River Gorge National River. Photo: S. Murphy.

CONTACT INFORMATION

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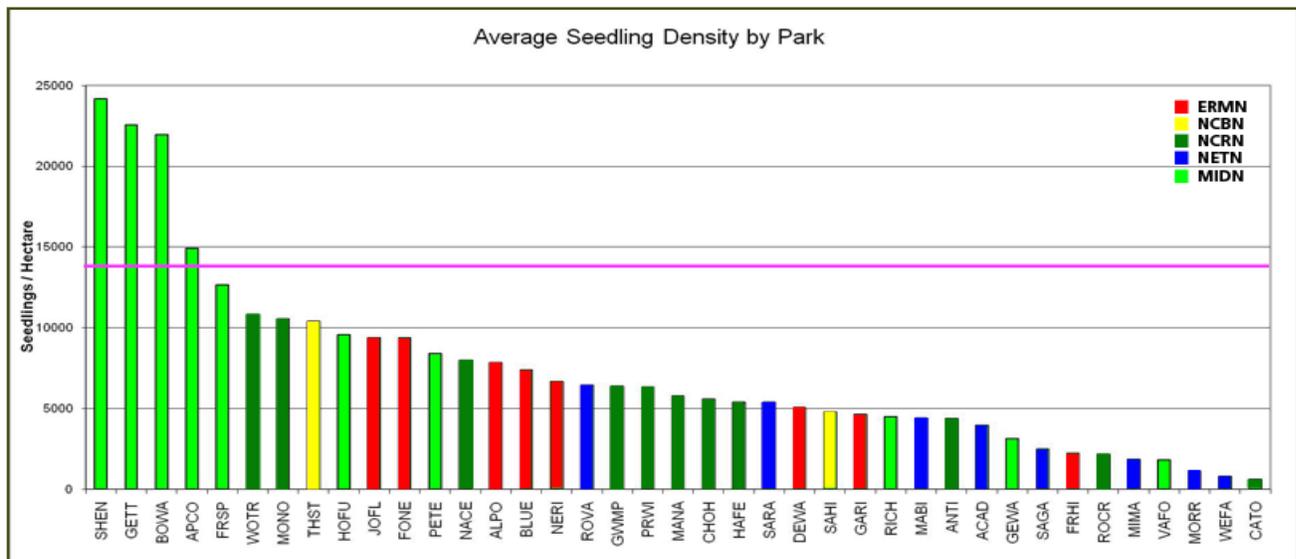


Figure 4. Average tree seedling density measured between 2006 - 2009 in 39 national parks with comparable regeneration sampling methods. The solid pink line shows the suggested target of 14,000 seedlings per hectare for forests with low deer browse pressure. Graph Credit: S. Perles

ACRONYMS DECODED

ACAD = Acadia National Park, ALPO = Allegheny Portage Railroad National Historic Site, ANTI = Antietam National Battlefield, APCO = Appomattox Court House National Historical Park, APHN = Appalachian Highlands Network, BLUE = Bluestone National Scenic River, BOWA = Booker T. Washington National Monument, CACO = Cape Cod National Seashore, CATO = Catoctin Mountain Park, CHOH = Chesapeake and Ohio Canal National Historical Park, CUPN = Cumberland Piedmont Network, DEWA = Delaware Water Gap National Recreation Area, ERMN = Eastern Rivers and Mountains Network, FONE = Fort Necessity National Battlefield, FRHI = Friendship Hill National Historic Site, FRSP = Fredericksburg and Spotsylvania National Military Park, GARI = Gauley River National Recreation Area, GETT = Gettysburg National Military Park, GEWA = George Washington Birthplace National Monument, GWMP = George Washington Memorial Parkway, GLKN = Great Lakes Network, GRSM = Great Smoky Mountains National Park, HAFE = Harpers Ferry National Historical Park, HOFU = Hopewell Furnace National Historical Site, JOFL = Johnstown Flood National Memorial, MABI = Marsh-Billings Rockefeller National Historical Park, MANA = Manassas National Battlefield, MIDN = Mid-Atlantic Network, MIMA = Minute Man National Historical Park, MONO = Monocacy National Battlefield, MORR = Morristown National Historical Park, NACE = National Capital Parks East, NCRN = National Capital Region Network, NCBN = Northeast Coastal and Barrier Network, NERI = New River Gorge National River, NETN = Northeast Temperate Network, PETE = Petersburg National Battlefield, PRWI = Prince William Forest Park, RICH = Richmond National Battlefield Park, ROCR = Rock Creek Park, ROVA = Roosevelt-Vanderbilt National Historical Sites, SAGA = Saint Gaudens National Historic Site, SAHI = Sagamore Hill National Historic Site, SARA = Saratoga National Historical Park, SHEN = Shenandoah National Park, THST = Thomas Stone National Historic Site, VAFO = Valley Forge National Historical Park, WEFA = Weir Farm National Historic Site, WOTR = Wolf Trap National Park for the Performing Arts