



Forest Regeneration 2015

Resource Brief

Importance

Forests make up about three quarters of the landcover in National Capital Region (NCR) parks. And their continued regeneration (the survival of seedlings and saplings to replace large forest trees as they die) is a growing concern.

If the forests of NCR parks were to gradually decline and diminish instead of regenerating, the parks would not only lose part of the distinct character, leafy shade, and cool microclimates that visitors enjoy, but animals and plants of all kinds that depend on the forests would be made vulnerable. From the tiniest, most specialized insects and pollinators, to forest floor salamanders, to flying squirrels and wildflowers, incredible numbers of species depend on the forests they live in.

High white-tailed deer populations (>8/km² per Horsley et al. 2003), like the levels found in the NCR, can not only significantly reduce forest regeneration levels, but can also reduce tree species diversity, density, and the average height of seedlings.

Assessing Regeneration

To assess forest regeneration, we analyzed long-term forest data from the National Capital Region Network, Inventory & Monitoring program (NCRN I&M). We used the number of seedlings and small saplings present, their size, and their distribution to calculate regeneration potential on a plot-by-plot basis with a formula called the “Stocking Index.” (A detailed explanation of Stocking Index calculation methods is in Schmit and Nortrup 2013)

Results - Low Regeneration Levels

Forest regeneration levels are low throughout National Capital Region parks. The Stocking Index threshold for healthy forest regeneration is that 67% of forest plots should be adequately stocked with seedlings and small saplings. No park exceeded 30%.

Low or zero value stocking index scores do not indicate a



Photo: NPS/Paradis

Seedlings in a light gap at Greenbelt Park

complete lack of tree seedlings. NCRN forest data shows tree seedlings present in all parks. However, where there are high deer populations, the seedlings that are present are often those less palatable to deer including species like American beech (*Fagus grandifolia*), pawpaw (*Asimina triloba*), or the invasive tree of heaven (*Ailanthus altissima*). Notably, tree seedlings in several NCR parks are dominated by pawpaw including: Antietam, C&O Canal, GW Parkway, Harpers Ferry, Monocacy, and National Capital Parks - East. Pawpaw is a small understory tree that cannot replace forest canopy trees.

The overall lack of forest regeneration throughout the National Capital Region remains a cause for concern. The state of NCR forest regeneration has changed very little since 2006-2009. As these low levels of regeneration persist, forests may enter long term decline.

Park Forest Management

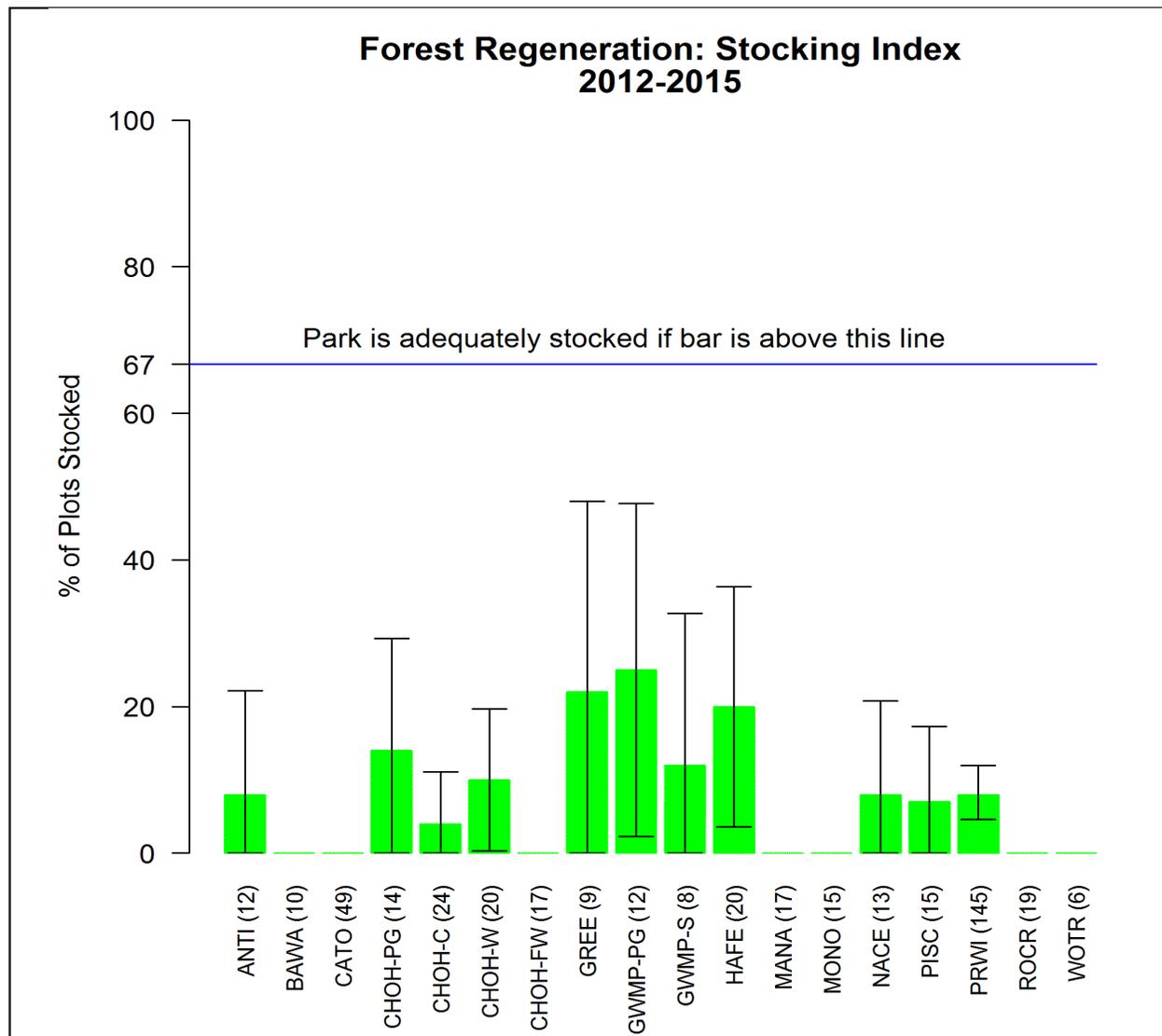
Catoctin Mountain Park and Rock Creek Park are currently reducing their deer populations to help boost forest regeneration. Other NCR parks continue to work through the environmental compliance process to address forest regeneration and health through deer management.

Catoctin Mountain Park has seen a surge in the abundance of small seedlings since park deer reductions began in 2009 that is not yet reflected in the Stocking Index. Seedlings have risen from about 630 per hectare in 2006-2009 to over 6,000 per hectare in 2012-2015. However, the Stocking Index assigns higher values to larger individuals so the increase in small seedlings has not yet registered in Catoctin's Stocking Index score.

An increase in the Stocking Index for Catoctin or Rock Creek will be an important indicator of the effectiveness of these programs.

More Information

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For a park as a whole to have healthy regenerative capacity, 67% of plots must be adequately stocked (blue line). The horizontal axis shows park abbreviations are followed by the number of NCRN forest monitoring plots in that park in parenthesis. T-shaped error bars indicate 95% confidence intervals for the percent of plots with adequate regeneration levels.

Park Abbreviations

ANTI = Antietam National Battlefield
 BAWA = Baltimore–Washington Parkway
 CATO = Catoctin Mountain Park
 CHOH-C = Central part of C&O Canal National Historical Park from Vi-
 lettes Lock to Harpers Ferry
 CHOH-PG = Potomac Gorge managed by C&O Canal
 CHOH-W = Western C&O Canal from Harpers Ferry to Four Locks
 CHOH-FW = Far western C&O Canal from upstream of Four Locks to
 Cumberland
 GREE = Greenbelt Park

GWMP-PG = Potomac Gorge managed by George Washington Memo-
 rial Parkway
 GWMP-S = George Washington Memorial Parkway south of Key Bridge
 HAFE = Harpers Ferry National Historical Park
 MANA = Manassas National Battlefield Park
 MONO = Monocacy National Battlefield
 NACE = DC portion of National Capital Parks - East
 PISC = Piscataway and Fort Washington Parks
 PRWI = Prince William Forest Park
 ROCR = Rock Creek Park
 WOTR = Wolf Trap National Park for the Performing Arts

Citations: Horsley, S.B., S.L. Stout, and D.S. DeCalesta. 2003. White-tailed deer impact on the vegetation dynamics of a northern hardwood forest. *Ecological Applications* 13:98-118.

Schmit, J.P. and M. Nortrup. 2013. NCRN Resource Brief: Forest Regeneration 2013. <https://irma.nps.gov/DataStore/Reference/Pro-file/2205449>.