



Forest Regeneration 2014

Resource Brief

Importance

Forests are the dominant natural vegetation in the parks of the National Capital Region Network (NCRN). In recent years, park managers have been increasingly concerned about forest “regeneration.” Forest regeneration is simply the survival of seedlings and saplings to replace large forest trees that die.

One reason for this concern about regeneration is high deer densities. At high densities (>8/km²), white-tailed deer can significantly reduce forest regeneration as well as tree species diversity, density, and average height of seedlings. Deer densities in NCRN parks are high enough to cause negative impacts to forest vegetation (Bates 2012).



Photo: NPS/Paradis

Rock Creek Park.

Regeneration and the Stocking Index

We used a stocking index developed by the U.S. Forest Service to determine if seedling levels in NCRN forests are sufficient for regeneration.

The index accounts for: the number of seedlings and small saplings, their size, and their distribution. Obviously, the more seedlings and small saplings present the better. Size is important, as taller seedlings are more likely to survive than smaller seedlings. Finally, a forest is more likely to successfully regenerate if the seedlings are spread out than if they are concentrated in only a few places.

To calculate the stocking index for each park, we used 2011-2014 NCRN forest vegetation data, including all tree species both native and exotic. Only seedlings at least 15 cm tall and saplings 1- 2.5 cm diameter at breast height were used to score each plot. Larger individuals earned more points. (A more detailed explanation of stocking index calculations can be found in previous Forest Regeneration resource briefs from 2013, 2012, and 2011; <http://science.nature.nps.gov/im/units/ncrn/monitor/forest/index.cfm>.)

An entire park is considered to be adequately stocked if 67% of plots score above the threshold.

Results

Overall, no NCRN parks have adequate stocking index levels (see reverse). While more than half of the parks have at least one plot that is adequately stocked, none has more than 25% of their plots adequately stocked (the goal for adequate stocking is 67%).

Catoctin Mountain Park has seen a doubling 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 5,000 per hectare in 2011-2014. 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.

Harpers Ferry National Historical Park is one of the few parks that has shown an increase in the stocking index. In the 2008-2011 period, zero plots at Harpers Ferry had adequate stocking, while in the current 2011-2014 period, about 15% (or 3 plots) are now adequately stocked. This rise in the stocking index however, is due in large part to an increase in pawpaw (*Asimina triloba*) which deer avoid, from ~4,000 to 6,500 per hectare, in those three plots.

The overall lack of forest regeneration in the NCRN remains a cause for concern. As low levels of regeneration persist, forests may enter long term decline. Currently Catoctin and Rock Creek are reducing their deer populations to help regeneration rates recover. An increase in the stocking index of these parks will be an important indicator that these programs have reached an improved forest regeneration capacity.

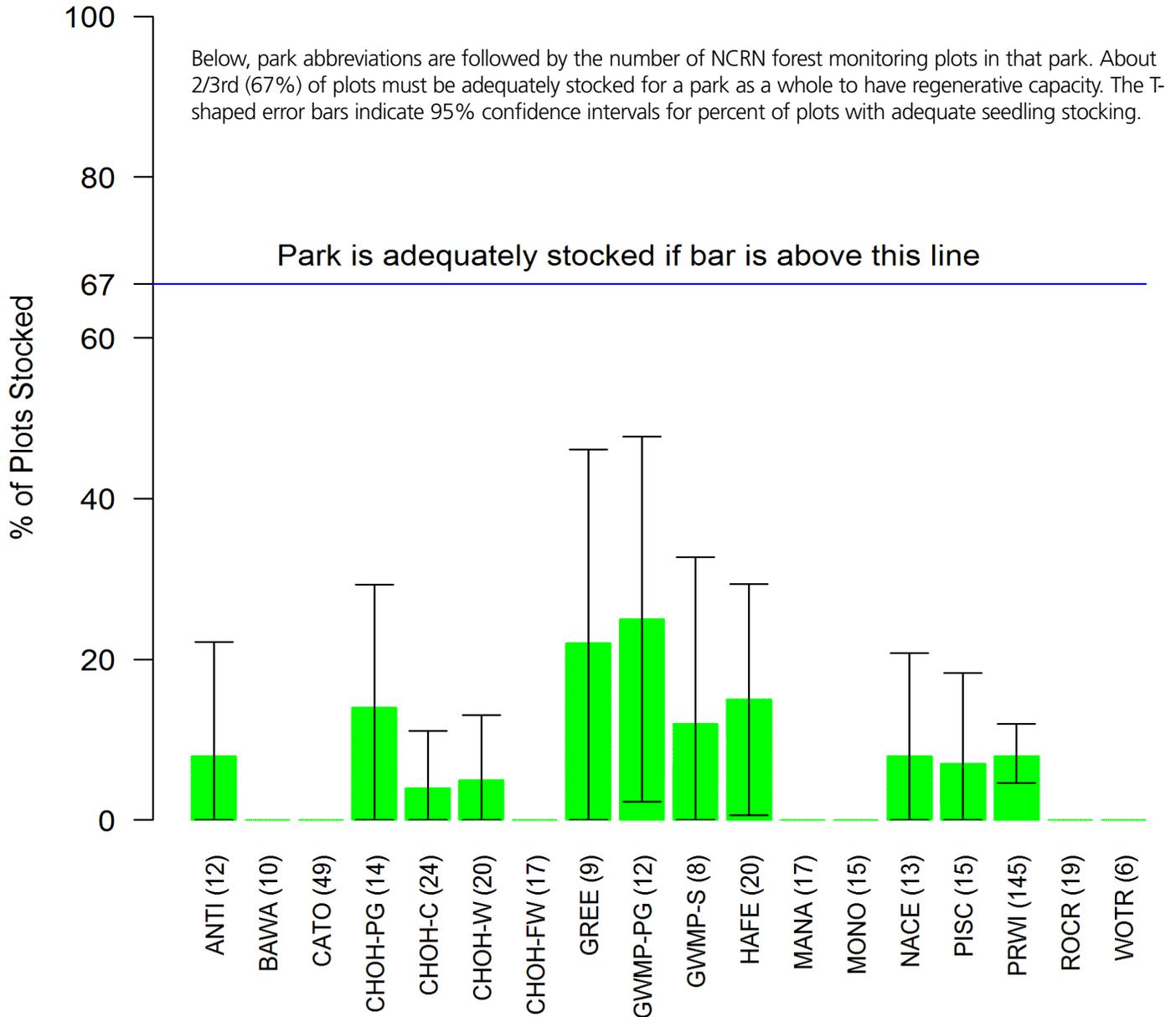
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<http://science.nature.nps.gov/im/units/ncrn>



Forest Regeneration: Stocking Index 2011-2014



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 Violettes 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

GWMP-PG = Potomac Gorge managed by George Washington Memorial 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