

Probable Failure of Forest Regeneration Requires Sustained Management in Rock Creek Park

Introduction

Forests are a key part of the landscape and visitor experience in Rock Creek Park (ROCR). Forest ecosystems are facing many stressors, including non-native plants, invasive tree pests, overabundant deer, lack of fire, and adjacent development affecting incoming water levels and wind exposure. These stressors diminish forest resilience, defined as the ability of an ecosystem to experience disturbance and rebound to similar functions, structure, and composition. A lack of tree regeneration—seedlings and saplings of canopy-forming trees—is an early indicator of reduced resilience and potential for future forest loss.

A recent study by several NPS Inventory and Monitoring networks assessed regeneration metrics in 39 parks from 2008 to 2019, including at ROCR. Parks were placed in one of four regeneration categories (Secure, Insecure, Probable Failure, and Imminent Failure), based on a variety of metrics that represent the amount and diversity of tree regeneration. Forests in 27 of 39 parks were classified in either imminent or probable failure categories due to a lack of seedlings and saplings in the understory. ***The study identified overabundant white-tailed deer and invasive plants as the leading causes of concern for forest regeneration.*** For more detailed information on the full study, see the source publication in the Resources section below.



Hungry white-tailed deer can eat much of the vegetation in a forest that is within their reach.
NPS

Main Findings

As of data collected through 2019, on a four-category scale (Secure, Insecure, Probable Failure, and Imminent Failure), ROCR has a forest regeneration status of **Probable Failure**. This designation means that the park forests have insufficient regeneration, as indicated by inadequate and decreasing saplings as well as low numbers of seedlings. Even though Rock Creek's seedling numbers tripled between 2013 and 2022 after implementing deer management, park forests are still recovering from many years of overabundant deer and don't yet contain enough seedlings and saplings of native canopy-forming trees to replace mature trees as they die.

Despite ROCR showing acceptable sapling composition and moderately poor seedling composition in the study, the park has high number of white ash (*Fraxinus americana*) seedlings. Due to the presence of ash-destroying emerald ash borer (EAB) in the Mid-Atlantic, these seedlings are unlikely to survive to adulthood. Further, as park forests mature and overstory trees die, these doomed ash seedlings along with common invasive shrubs (like non-native *Viburnum spp.*) may rapidly increase, limiting the regeneration of canopy tree species and eventually altering the composition and structure of the forests.

Beech Leaf Disease (BLD), discovered in Virginia's Prince William Forest Park in 2021, is another potential concern for Rock Creek Park. American beech makes up 17% of ROCR's trees and 44% of its saplings. The disease has not yet been observed in Rock Creek, but should it invade the park, it will likely cause major dieback of beech in both the canopy and sapling layers.

Management Recommendations

Eastern national parks need sustained, [integrated forest management](#) to secure sufficient regeneration and avoid future forest loss. We suggest that managers at ROCR:

- Continue deer population reductions, ongoing at ROCR since 2013, to protect forest regeneration from browse impacts and allow seedling and sapling recovery.
- Continue to remove invasive plants through methods including early detection and rapid response, and strategic invasive plant management in high priority habitats. Also consider release of approved biological controls.
- Consider tools available to address forest insect pests and pathogens. Assess forest stands at risk or already impacted and prioritize invasive plant management where canopy gaps have increased or may increase soon.
- Consider restoration tree planting in severely degraded forest areas.
- Continue to explore creative ways to advance integrated forest management in the park, like the Forest Resilience Framework that is in development with Rock Creek Conservancy, which will prioritize forest units that need intervention and inform the application of management actions in these areas.

Not only continuing but expanding these management efforts are especially important for ROCR since without them, the park is at risk of losing forest cover along with its ecosystem services, habitat for vulnerable species of plants and animals, and connectivity with other natural areas.

With conditions changing rapidly, NPS park and regional staff should continue to use an adaptive management lens, by frequently re-assessing forest conditions and assessing management effectiveness using long-term ecological monitoring data collected by the park and the Inventory & Monitoring program. Please refer to the source publication for more information on management strategies and reach out to the contact below for further assistance.

Resources

Source Publication: Miller K., Perles S., Schmit J.P., Matthews E., Weed A., Comiskey J., Marshall M., Nelson P., Fisichelli N. (2023). Overabundant deer and invasive plants drive widespread regeneration debt in eastern national parks. *Ecological Applications*.

<https://doi.org/10.1002/eap.2837>

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Links:

NPS News Release: [Reducing deer numbers and removing invasive plants are key to long-term forest health - Catoctin Mountain Park \(U.S. National Park Service\) \(nps.gov\)](#)

[Managing Resilient Forests Initiative for Eastern National Parks](#)

Park resource briefs based on (Miller, 2023) are available at: <https://schoodicinstitute.org/park-forests>

NCRN I&M [Forest Vegetation Monitoring](#) webpage