



Northeast Coastal and Barrier Network

Forest Vegetation Resource Brief



Colonial National Historical Park 2012 Status & Trends

In 2012, 12 plots were established in Colonial National Historical Park (COLO), two in the Jamestown unit and 10 in Yorktown. With only one-half of the total plots established in the park, the following highlights are preliminary. No plots have been revisited, so it is not possible to comment on how the forests in Colonial NHP are changing over time.

All trees with a diameter at breast height (DBH) equal to or greater than 10 cm were measured and their condition was

assessed. There are more trees per plot in Yorktown than Jamestown, resulting in a greater average number of species. The total number of tree species is also greater in Yorktown largely due to a greater diversity of habitats in that unit and to the larger number of plots sampled. Forests in Yorktown also have a greater number of larger trees, probably related to higher disturbance rates in Jamestown (Figure 1).

Three microplots in each plot were sampled for tree saplings and shrubs with diameters greater than 1 cm and less than 10 cm. The forests of Jamestown had more saplings than Yorktown, but the diversity of sapling species was lower.

Tree seedlings are identified in each of 12 quadrats, and their heights measured. The number and height of seedlings determines whether there is adequate regeneration to sustain the forest canopy.

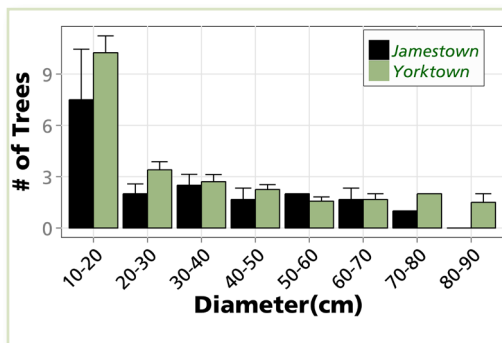


Figure 1. Distribution of mature trees in different diameter size classes at Colonial NHP.

Objectives

1. Determine the status and trends in forest structure, composition, and dynamics of canopy and understory woody species.
2. Determine the status and trends in the density and composition of native tree seedlings and selected herbaceous species that are indicators of deer browse.
3. Detect and monitor the presence of invasive exotic plants, exotic plant diseases and pathogens, and forest pests.
4. Determine the status and trends in forest coarse woody debris and the availability of snags.
5. Determine the status and trends in soil Ca:Al and C:N ratios to assess the extent of base cation depletion, change in aluminum availability, and nitrogen saturation impacting NCBN forest soils. (Soils are not sampled in COLO).



Importance

The Mid-Atlantic region is primarily a forested ecoregion and Northeast Coastal and Barrier Network parks selected for monitoring have forests that form an essential part of the landscape and provide habitat for a diversity of wildlife. Forest structure, composition, and dynamics are important measures of forest condition and health. Changes in these metrics can be indicative

of stressors that may result in alterations in the future ecological integrity of forest communities. For example, high tree mortality rates can signal a change in the canopy species; declines in seedling and sapling densities can indicate a reduced capacity of the forest to regenerate; or increases in invasive exotic plants can exclude other herbaceous plants in the forest understory.

Management Applications

- Provide a measure of forest health and changes over time.
- Indicate composition and trends in invasive exotic plants, pests, and pathogens in the park.
- Evaluate the impact of and trends in white-tailed deer browse on forest understory communities.

Long-term Monitoring

Plot locations were randomly selected from a 250-m sampling grid. Each plot consists of a 20 x 20 m square where all trees and shrubs with a diameter at breast height (dbh) ≥ 10 cm are identified, measured, tagged, marked, and mapped, and their condition is assessed. Trees and shrubs with a dbh ≥ 1 cm are identified, measured, marked, and tagged in each of three microplots. The number and height of tree seedlings and cover of a select group of

native and invasive herbaceous indicator plants are recorded in 12 quadrats. Coarse woody debris is measured along three transects. Soil samples are collected in all parks except COLO. A variety of parameters are measured to describe the overall plot characteristics, including vegetation cover at different strata or layers, evidence of disturbance and deer-browse, slope, and aspect. The plots are revisited every four years to evaluate changes.

2012 Status & Trends...

In parks where deer densities are high, a larger number of seedlings is required due to the heavier browse pressure than in parks where deer densities are low. Thus, regeneration is considered as “Good” if it exceeds the high deer density stocking index, and “Significant Concern” when it falls below the low deer density stocking index in any park. Jamestown regeneration levels are ranked as “Caution” while those in Yorktown are of “Significant Concern” (Figure 2). Additional plots in both units will help us determine if there is cause for long-term concern regarding forest regeneration.

Invasive exotic and native indicator species are also monitored in the quad-

rats. Japanese stiltgrass (*Microstegium vimineum*) was by the far the most common invasive exotic indicator species encountered, with it occurring in 75%

of plots in Yorktown and Jamestown. In Jamestown, the average cover of stiltgrass per plot was 5-10% where it was the only invasive indicator species present. The most common native indicators were roundleaf greenbrier (*Smilax rotundifolia*) in Jamestown and grape (*Vitis* spp.) and sedges (*Cyperaceae*) were common in Yorktown.

In 2013, field crews will establish additional plots in the two units of Colonial NHP adding to our understanding of the forest composition of the park. All new plots will be established in the park by 2014 with the first revisits occurring in 2015. At that time, evaluation of trends in the parks forests will be possible.

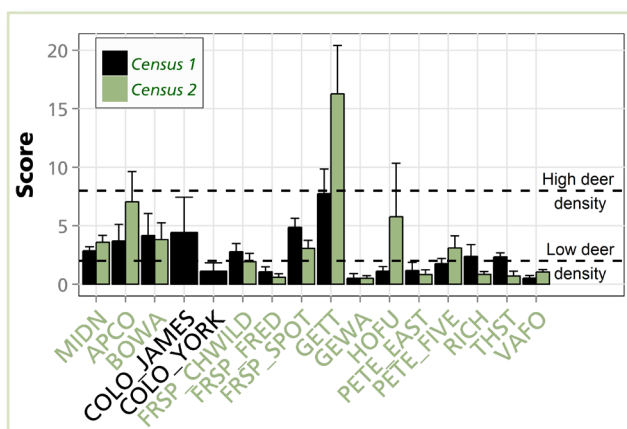


Figure 2. Mean regeneration scores for the Mid-Atlantic Network and individual parks in 2007 and 2008 (Census 1) and 2011 and 2012 (Census 2). For Colonial, only one census has been conducted. Lines indicate minimum score needed to maintain sustainable regeneration under low and high deer densities. Codes refer to the parks monitored (see below; full report at science.nature.nps.gov/im/units/midn).

Photos by James Comiskey.

A Final Note

It is important to note that the data presented here are preliminary. Only one-half of the park's plots have been established, and therefore information we report are likely to change as we add more data. However, these early results illustrate the analyses and indicators derived from long-term monitoring and their value to park management.

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Parks monitored: Appomattox Court House NHP • Booker T. Washington NM • Colonial NHP • Fredericksburg & Spotsylvania NMP • Gettysburg NMP • George Washington Birthplace NM • Hopewell Furnace NHS • Petersburg NB • Richmond NBP • Sagamore Hill NHS • Thomas Stone NHS • Valley Forge NHP

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