



Natural Resource Condition Assessment for Petersburg National Battlefield

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Petersburg National Battlefield (NB) resources are managed within a historical and cultural context. The siege of Petersburg began in June 1864 by General Grant in a historic battle that would last 10 months and lead to the fall of the Confederacy.



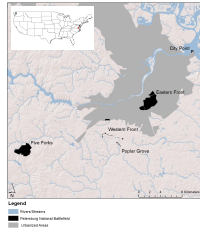
Photos courtesy of Sarah Knight, NPS

What is an NRCA?

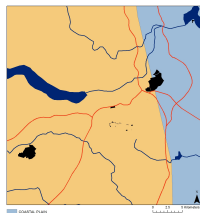
Natural resource condition assessments evaluate the current conditions and trends for a subset of natural resources indicators meant to be reflective of the values and stressors for a national park. <http://nature.nps.gov/water/nrca/index.cfm>

Where is Petersburg NB?

Petersburg NB is situated just south of the Appomattox River, near the Fall Line. The Park was established in 1926 to memorialize peace between the states.



The Eastern Front and Five Forks are the two largest of six park units and were the primary focus of the assessment. The two sites are located in drastically different surrounding landscapes which is an important influence on their natural resource conditions.



The physiographic location of the units also has an impact on resource condition. The Eastern Front and City Point fall within the Coastal Plain physiographic region. The remaining four units, including Five Forks, lay within the Piedmont region.

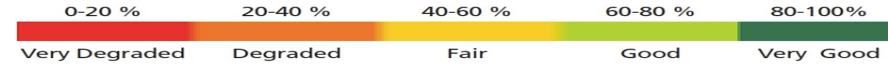
NRCA model at Petersburg:



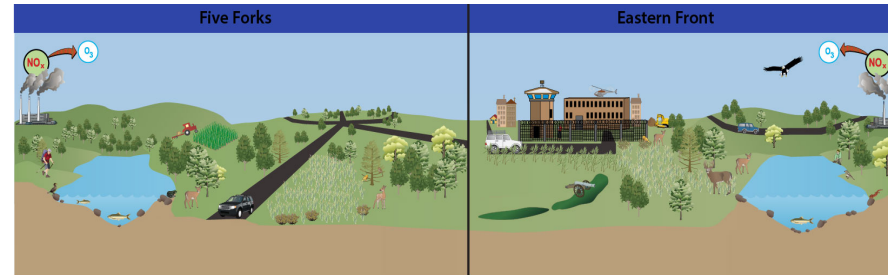
Condition and trend are assessed systematically by describing the park resource setting; consulting with relevant stakeholders to select indicators; compiling available data for resources and stressors; identifying quantifiable metrics to evaluate indicators; using available literature and expert opinion to develop thresholds for these metrics; and comparing available data to thresholds to derive a percentage score for each metric.

Conceptual Framework

Indicators were selected to reflect the Park's physical, ecosystem, and human use stressors and values. The approach for assessing resource condition within Petersburg NB (as separate units and the park as a whole) required establishment of a reference condition (i.e., threshold) for each metric. Thresholds ideally were ecologically based and derived from the scientific literature.



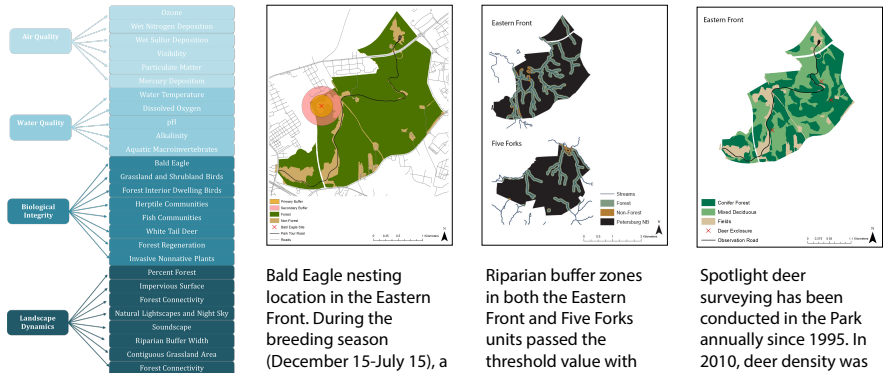
Petersburg National Battlefield Conceptual Model



Physical Features	Ecosystem Features	Human-Use Features
<p>City Point is situated on a bluff that overlooks the James River to the north and east and the Appomattox River to the west. Small creeks run through both of the main units.</p> <p>Park topography is characterized as gently rolling countryside. This rolling topography has both historical and biological significance. It heavily influences viewpoints and the visitor experience.</p> <p>Air pollution is high in the region. Air quality affects the human health, terrestrial and aquatic ecosystems, plant defoliation and structure, and nutrient cycling.</p>	<p>Forests are approximately 75 years in age and range from pine to mixed pine and hardwood. Areas used for interpretation, including roadsides and walking areas near four-tours, have been planted with grasses and are actively maintained by mowing.</p> <p>Invasive plant species are found at low to moderate levels with Japanese stiltgrass pervasive in the Eastern Front. Oaks are an especially palatable species that deer selectively browse throughout the eastern United States, often resulting in direct impacts on forest composition.</p> <p>The Park provides shelter, food, and breeding habitat for a diverse biota including a nesting pair of bald eagles. During the nesting and breeding season, the primary zone around this nest is closed to all human activity and activities in the secondary zone would be maintained.</p>	<p>Urban growth surrounding the park is a major influence including the adjacent Fort Lee military base. Since 2005 the population of the base has nearly doubled in size, growing to a population of nearly 45,000 (including military personnel, civilians, contractors, and students).</p> <p>Approximately 140,000 people visit the Park annually in addition to visiting Park battlefields and visitor centers, visitors hike, bike, fish, and birdwatch among other activities influenced by Park Natural resources.</p> <p>Petersburg National Battlefield is especially known for the many earthworks located in the Eastern Front Unit. These earthworks have historical and cultural value to the Park and make Petersburg a distinct place to visit.</p>

Indicators

Originally suggested by park staff and refined during further meetings, a total of 27 indicators were chosen based on data availability, ecological significance, and scientific literature. At the national level, these indicators were selected to be consistent with NPS Inventory and Monitoring Vital Signs when possible.



Bald Eagle nesting location in the Eastern Front. During the breeding season (December 15-July 15), a 750-foot perimeter is blocked off to support breeding success.

Riparian buffer zones in both the Eastern Front and Five Forks units passed the threshold value with forests covering 93% and 92% of a 50-meter buffer, respectively.

Spotlight deer surveying has been conducted in the Park annually since 1995. In 2010, deer density was 48.6 deer/km², well over the threshold of 8 deer/km².

Key Findings

- The overall condition of natural resources in Petersburg NB were assessed as "good", attaining 64% of desired threshold scores. However the confidence in the assessment is limited for some key indicators due to minimal data availability.
- Improving trends are noteworthy for regional air quality (ozone, wet nitrogen deposition, wet sulfur deposition, and visibility), which was the primary resource of concern in this assessment.
- Biological integrity was the next most degraded resource. Issues of concern were associated with the fish communities, white-tailed deer, and forest regeneration metrics.
- The expansion of neighboring Fort Lee military base was a significant contributing factor to trends in landscape dynamics.
- When assessed separately, the more urban Eastern Front unit scored ten points lower than the Five Forks unit.

Vital Sign	Reference Condition Attainment	Current Condition	Trend
Air Quality	17%	Very Degraded	Improving
Water Quality	88%	Very Good	Stable
Biologic Integrity	67%	Good	Stable to degrading
Landscape Dynamics	80%	Very Good	Degrading
Petersburg National Battlefield	64%	Good	

Discussion and Recommendations

- Although air quality is "very degraded", this is due to regional sources over which the Park has very little if any control.
- Water quality is affected by the entire watershed and warrants careful continued monitoring as development continues along Park boundaries.
- Treatment of non-native invasive plants in the Park should reflect the high spatial variability of their distribution among and within Park units.
- High white-tailed deer populations and low forest regeneration are likely related, but additional data should be collected to resolve this relationship.
- Proposed Park expansion should take into account the need to improve connectivity among existing Park units.
- Grassland conversion is likely warranted for natural resource as well as historical reasons, but any actions should also consider potential impacts on forest connectivity.

Acknowledgements

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