

Vegetation Restoration Planning at Lincoln Boyhood National Memorial

By Noel B. Pavlovic

Many NPS units were created in the 1960s and '70s from a mosaic of natural communities and man-produced landscapes. The 200-acre Lincoln Boyhood National Memorial (LIBO), Spencer County, Ind., for example, was amalgamated in 1962 from a mosaic of reforested land, old fields and abandoned homesites. In 1984, I was asked by Mike Ruggiero, then Midwest Region Chief Scientist, to conduct a study of what the vegetation was like when the Thomas Lincoln family arrived there in 1816.

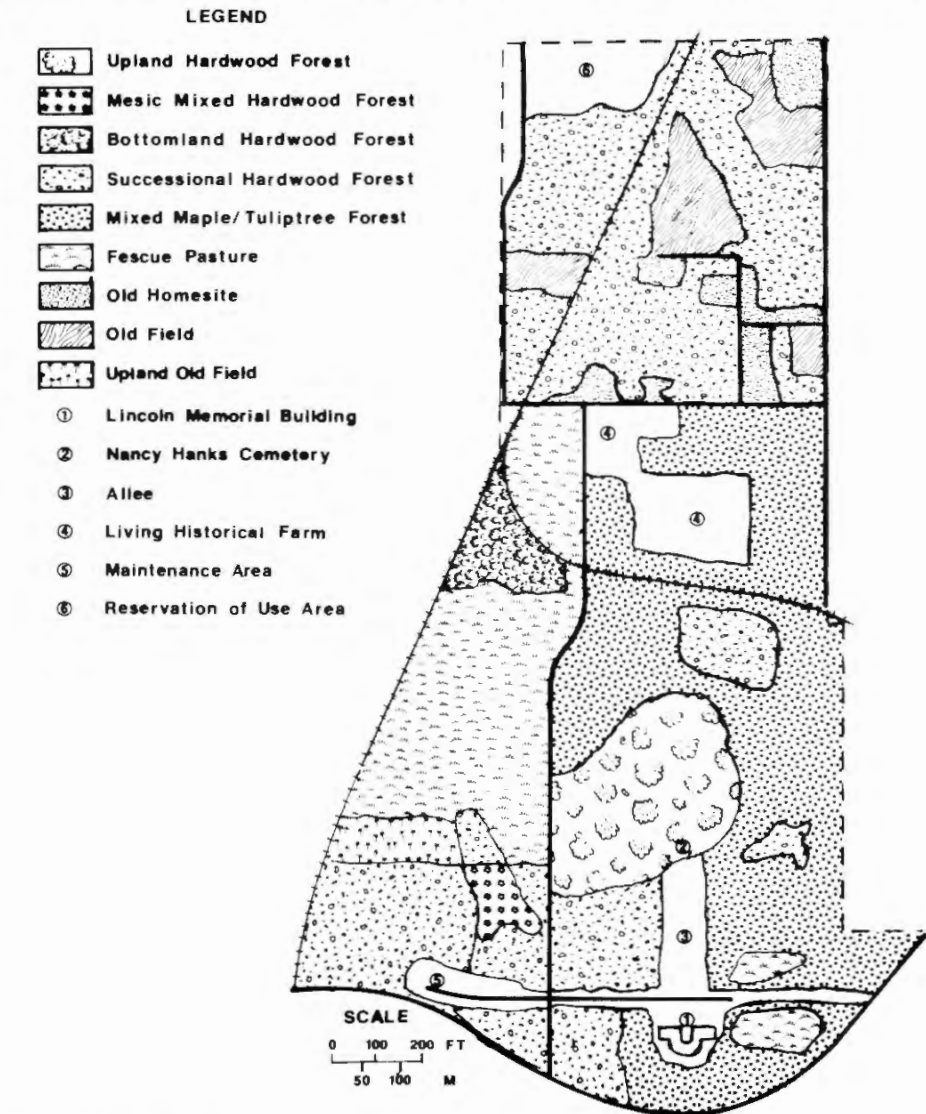
The project was motivated by the park's management goal of re-establishing the historic scene. Here Abraham Lincoln spent most of his childhood and suffered the loss of his mother, Nancy Hanks, from "milk sickness." We were to compare and contrast the 1816 vegetation with existing vegetation and recommend how the park could recreate similar community types. A ranking system was developed to assist in the prioritization of management activities. Unlike historical and cultural parks in the east, there were no records that would allow the recreation of a historically accurate landscape scene.

We used the 1805 General Land Survey Notes to examine the presettlement forest cover surrounding the land that was to become LIBO. We sampled the existing vegetation, using 52 stratified random 1/10th hectare plots throughout the park. All trees were identified and measured for diameter at breast height and shrub species were counted in a nested 1/20th hectare plot. Herbaceous frequency was quantified based on a systematic sample from 10 quadrats within each plot.

Classification Problems

Indirect gradient analysis and cluster analysis indicated a diverse type of communities bearing little relationship to topographic moisture gradient position. Consequently, the stands were classified relative to composition and past history and included bottomland and upland old fields, successional forest, upland old growth forest, mixed maple/tulip-tree forest (planted in the early 1900s) and abandoned homesites. Additional management research examined the possibility of tree planting in abandoned land and methods for eliminating Japanese honeysuckle.

Witness tree composition was examined across a topographic gradient and revealed the landscape was dominated by variants of oak-hickory forest. Based on these findings, along with soil and ecological information, Lincoln Boyhood was judged to have three types of oak-hickory forest: 1. bottomland forest, 2. mesic mixed forest, and 3. upland forest. The bottomlands



Map of existing vegetation at Lincoln Boyhood National Memorial.

and flatwoods had a mixture of pin oak, bitternut hickory, red maple, sweet gum, red elm and sycamore and river birch along stream courses. North facing drainages had a high diversity of mesic species, including white and black oak, black walnut, bitternut

and shagbark hickory and white ash, with an understory of dogwood, pawpaw, and spicebush. Such diversity was probably maintained by protection from fire and moderation of droughts. Uplands were dominated with white and black oak, shagbark and pignut hickory

and an occasional white ash. More exposed sites had more black oak and some individuals of post oak. The typical understory contained dogwood, redbud, and black haw.

Two Remnants Survive

Sampling of the existing (1985) vegetation revealed two remnants of the presettlement vegetation. Surrounding the highest point in the park and the Nancy Hanks Lincoln cemetery is a remnant oak-hickory forest. This old growth forest retained its canopy composition and structure; however past grazing (hogs) had nearly eliminated the characteristic spring ephemeral geophytic herbs. The latter conclusion was based on the abundance of jack-in-the-pulpit and

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green dragon, both species having toxic calcium oxalate (a deterrent to hogs), and poison ivy and the fact that the Lincolns had hogs. The forest showed no evidence for selective cutting of the overstory. Unlike the surrounding communities that were pastured in the 19th century, this stand lacked rank growth of Japanese honeysuckle. The other remnant was a small pin oak and bitternut hickory flatwoods at the western edge of the park. This remnant forest and xeric west-facing successional forests were similar in composition to presumed presettlement stands.

By the turn of the century, all the land surrounding the old growth forest was used for pasture. During the late 1920s or early 1930s a large portion of LIBO was reforested by the Civilian Conservation Corps. Plans indicated the intent of planting a wide variety of species; however the existing stand composition has low species diversity and fails to represent a natural community for this region. The overstory is a mixture of tulip tree and red or sugar maple. Sugar maple and tulip tree were introduced to the area at this time. The majority of the other forest types failed to compare with natural communities due to the predominance of shade tolerant and fire intolerant mesic species (such as red and sugar maple), the absence of oaks and hickories, the lack of herbaceous cover, and the ubiquity of Japanese honeysuckle.

Critical Management Issues

Critical management issues identified included the abundance of Japanese honeysuckle, vegetation inertia in abandoned homesites caused by exotic perennial lawn grasses, absence of oaks and hickories in the majority of the planted forests, the invasion of sugar maple and to a lesser extent tulip-tree into the old growth forest and the low abundance or absence of spring ephemeral herbs. Prescribed burning in some sections of the park may eliminate the invasion of shade tolerant and of fire sensitive tree species.

Management experiments to eliminate Japanese honeysuckle demonstrated that efforts may be most successful under a forested canopy where prolific growth is

absent. Use of glyphosate may also eliminate the few herbs present in these anthropogenic communities, unless it is applied in the fall after herb die back. Trial plantings of spring ephemeral herbs indicated that ground cover restoration is possible. Glyphosate was shown to reduce the cover of exotic perennial grasses in old lawns and allow invasion of successional herbs. Although the herbicide fails to kill all of the grasses, a somewhat natural successional process has been initiated.

Oak trees (black, white and pin) that were planted in the old field showed deer browse, which may be why old field succession has been so slow. During the final sampling, seedlings of shingle oak were found and the presence of these was taken as a positive sign for natural establishment of large-seeded tree species.

Restoration priorities were based on a quasi quantitative numerical ranking system divided into the following categories: ecological significance, historical significance, relative restoration cost, urgency for and practicality of restoration. Although all categories were given equal weights, they could be weighted to give certain categories greater importance. Stands given high priority include the upland old growth forest and the bottomland forest.

Forest restoration to approximate the presettlement vegetation at Lincoln Boyhood will require a long-term concerted effort of management. Restoration will require innovation, creativity, and monitoring. Failures may be expected. Those attempting to achieve the vision of an approximate oak-hickory forest should not be discouraged by failures and setbacks. All such efforts will contribute to our knowledge of community restoration.

Copies of the 106-page report may be obtained from the Superintendent, Lincoln Boyhood National Memorial, Lincoln City, IN 47552.

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