



## Trees of Uplands and Lowlands

## Resource Brief



Photo: NPS/Paradis

The Chesapeake and Ohio Canal National Historical Park (C&O Canal) spans 184.5 miles along the Potomac River from Washington, D.C., to Cumberland, MD. It is home to a variety of habitats including rocky outcrops, bluffs, floodplains, and wetlands.

To protect the C&O Canal’s natural resources, National Park Service staff from the Inventory and Monitoring (I&M) division monitor forest vegetation in seventy-five plots along the C&O Canal, tracking the composition and condition of trees, shrubs, and vines.

During monitoring, staff record data including the total number of trees at each plot, the species identity, and diameter at breast height (DBH) for every tree. This brief summarizes the most recent tree data for C&O Canal using a common forestry metric called the Importance Value (IV).

### Tree Importance Value

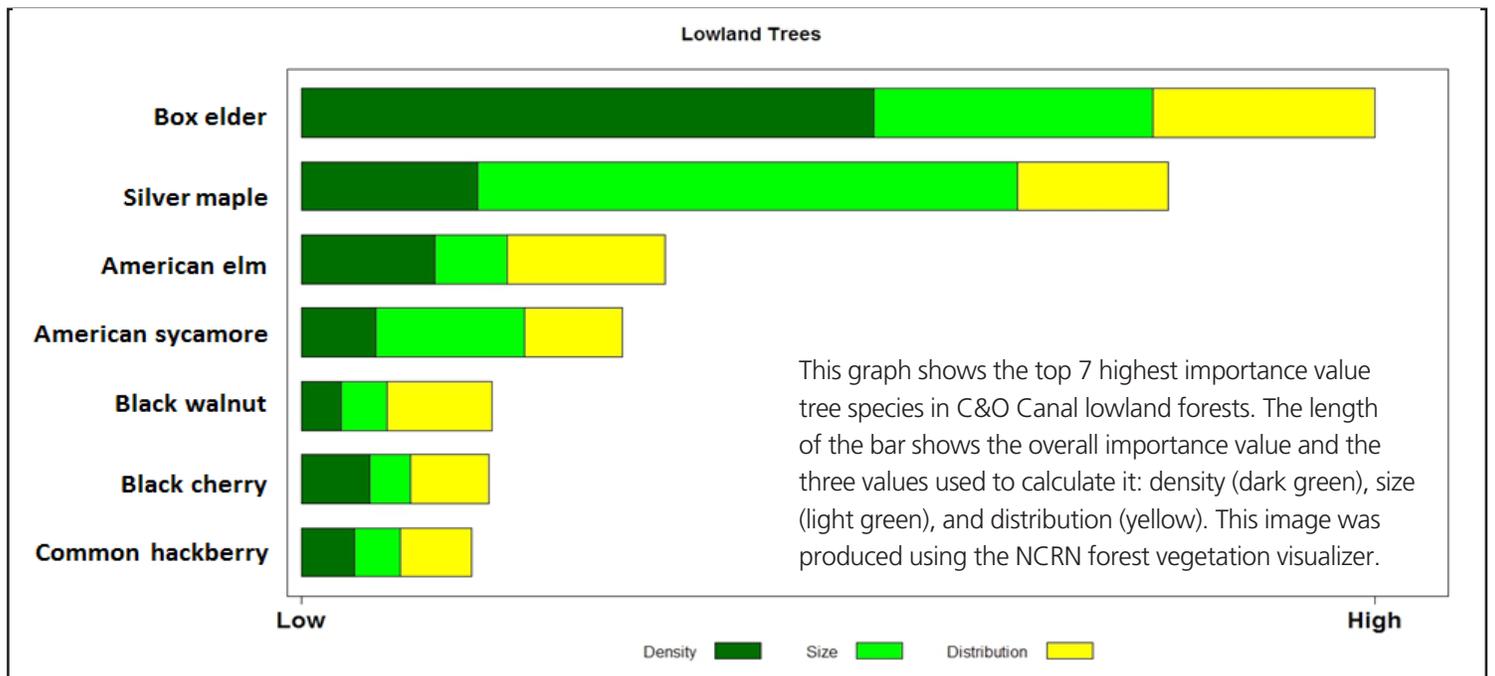
Tree Important Value (IV) is a metric for comparing the dominance of tree species found in a given area. IV is based

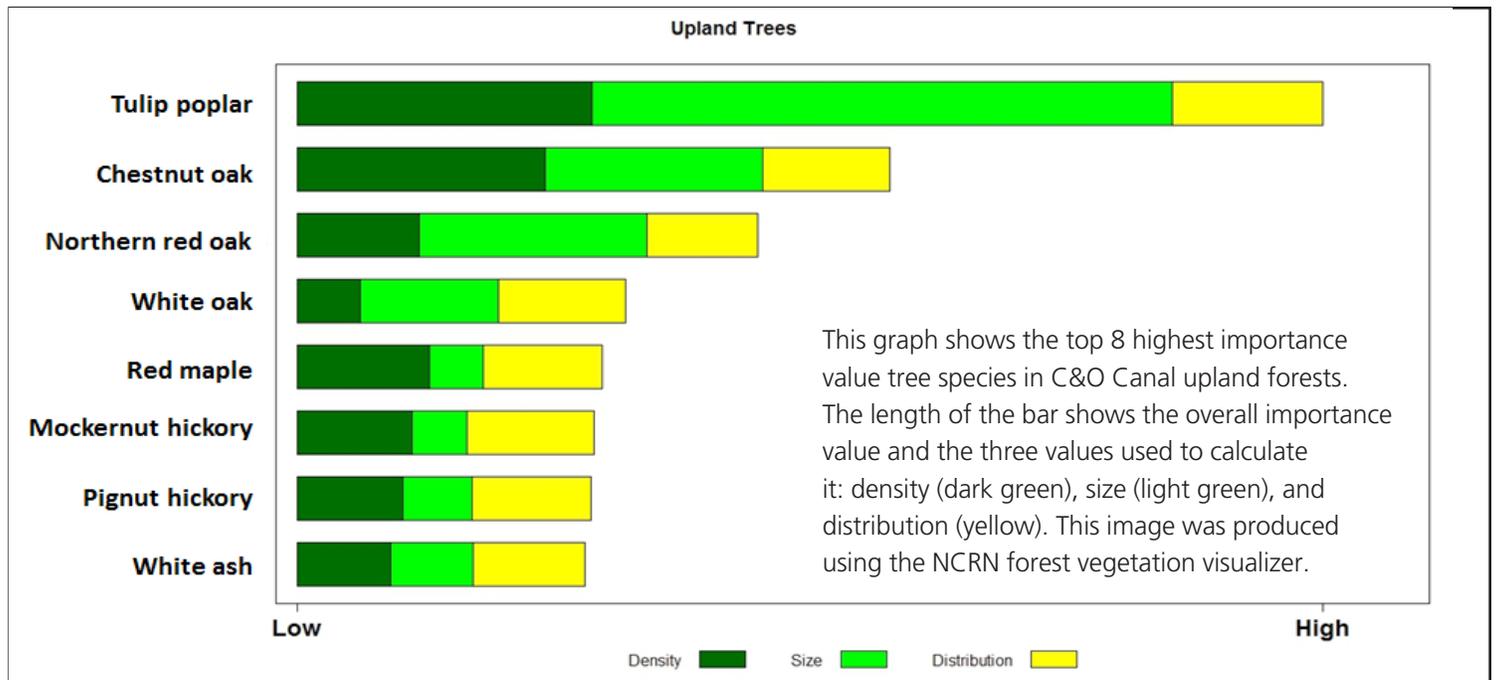
on three factors—density (number of individuals), size of individuals (calculated from DBH), and distribution (how wide-spread they are).\* In this brief, Importance Value will be used to compare tree species composition in upland and lowland sites on the C&O Canal.

### Trees of Lowland Floodplains

The C&O Canal parallels the Potomac River, whose floodplain covers about 85% of park land (Jarvis et al. 2013). A floodplain is the area of land adjacent to a river that experiences repeated flooding events. As a result of recurring floods, floodplains have unique soils and experience dynamic natural disturbances that result in vegetation composition distinct from the surrounding landscape, often referred to as “upland” habitat.

As seen below in Figure 1, the most “important” tree in C&O Canal lowland forests is box elder (*Acer negundo*), primarily because there are a great number of trees of this species. Silver maple (*Acer saccharinum*) comes in as second,





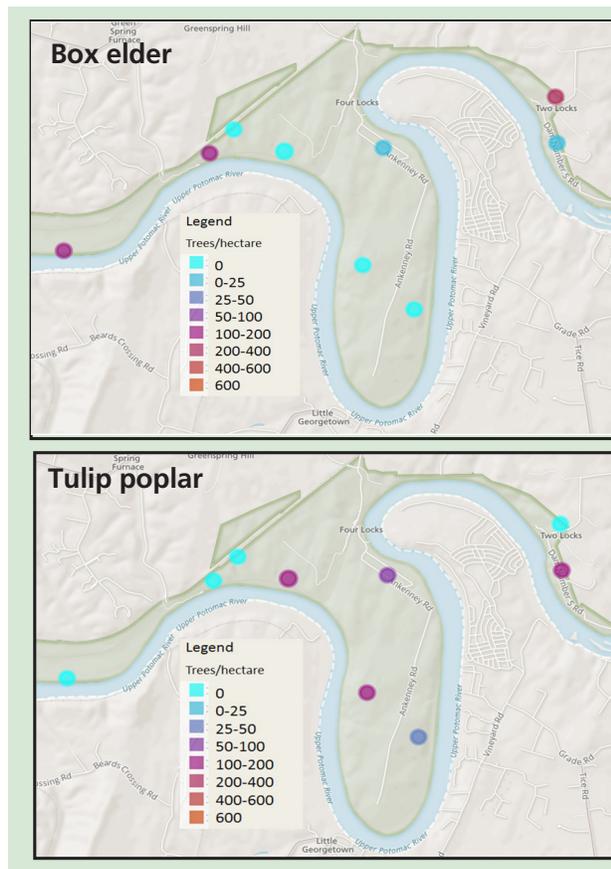
as silver maples tend to grow quite large, though they are fewer in number.

## Trees of Uplands

C&O Canal's upland forests (which are not influenced by repeated river floods) are dominated by tulip poplars (*Liriodendron tulipifera*). This species earns the highest Importance Value (Figure 2, above) for having a large number of trees, that are also large and widely distributed. Oaks (chestnut, northern red, and white; *Quercus* spp.) are the next three most dominant species of upland forests, with individuals growing to very large sizes. Red maple (*Acer rubrum*) and two species of hickory (*Carya* spp.) round out the list of upland tree species with the next highest importance values.

## Visualizing Vegetation

Anyone can create maps, graphs, and species lists from NCRN I&M forest data for the eleven National Parks in the greater Washington, D.C. area using the NCRN forest vegetation visualizer (<http://irmadev.nps.gov/r-reports/NCRN/ForestVeg/>). To learn more about NCRN forest monitoring, visit: <http://science.nature.nps.gov/im/units/ncrn/monitor/forest/index.cfm>.



**These maps show tree data in the Four Locks Area of C&O Canal (near Locks 47-50).**

**Above:** Box Elders, the highest importance value tree species in park lowlands, are concentrated close to the river, where the land is flatter and floods more regularly.

**Below:** Tulip poplars, the highest importance value tree species in park uplands, are concentrated away from the river at higher elevations where flooding is less common.

### References

Jarvis, G., S. DeGrush, and J. Henderson. 2013. Foundation document: Chesapeake and Ohio Canal National Historical Park. National Park Service, Hagerstown, Maryland.

\*Importance Value Formula: Importance Value = (# of individuals of species X/# of individuals of all species) + (Basal area of X/Basal area of all species) + (# of plots with species X/Sum of number of plots for each species).



**National Capital Region Network**  
<http://science.nature.nps.gov/im/units/ncrn>  
 202-339-8314

### Protocol Website:

More information and full reports may be found at <http://science.nature.nps.gov/im/units/ncrn/monitor/forest/index.htm>