



Trees of Uplands and Lowlands

Resource Brief

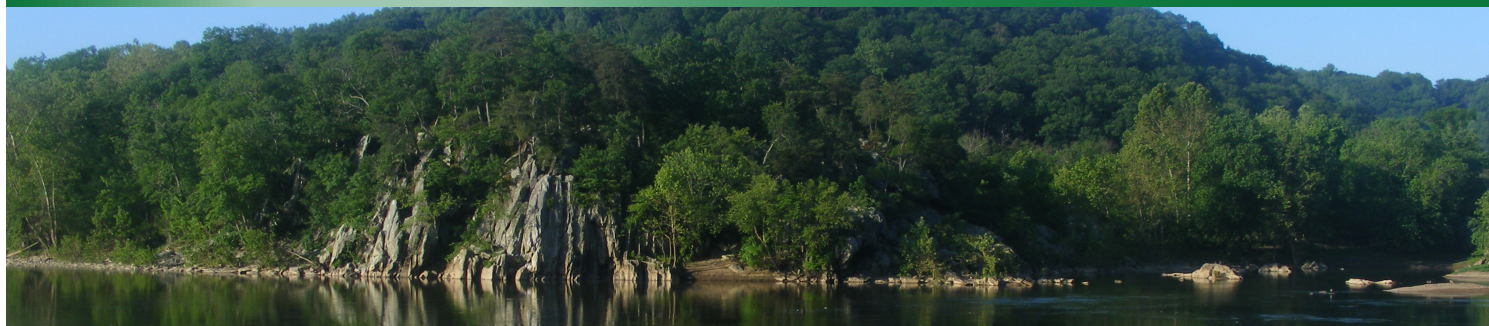


Photo: NPS/Tymkiw

George Washington Memorial Parkway (GW Memorial Parkway; GWMP) covers 7,600 acres along the Potomac River from Great Falls to Mount Vernon, Virginia. To the north, the landscape is composed primarily of ravines, rocky ledges, and heavily wooded terrain. To the south, it becomes coastal plain, characterized by low hills, marshes, and estuaries.

To help protect GWMP's natural resources, National Park Service staff from the Inventory and Monitoring (I&M) division monitor forest vegetation in twenty plots along GW Memorial Parkway, 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 GW Memorial Parkway using a common forestry metric called the Importance Value (IV).

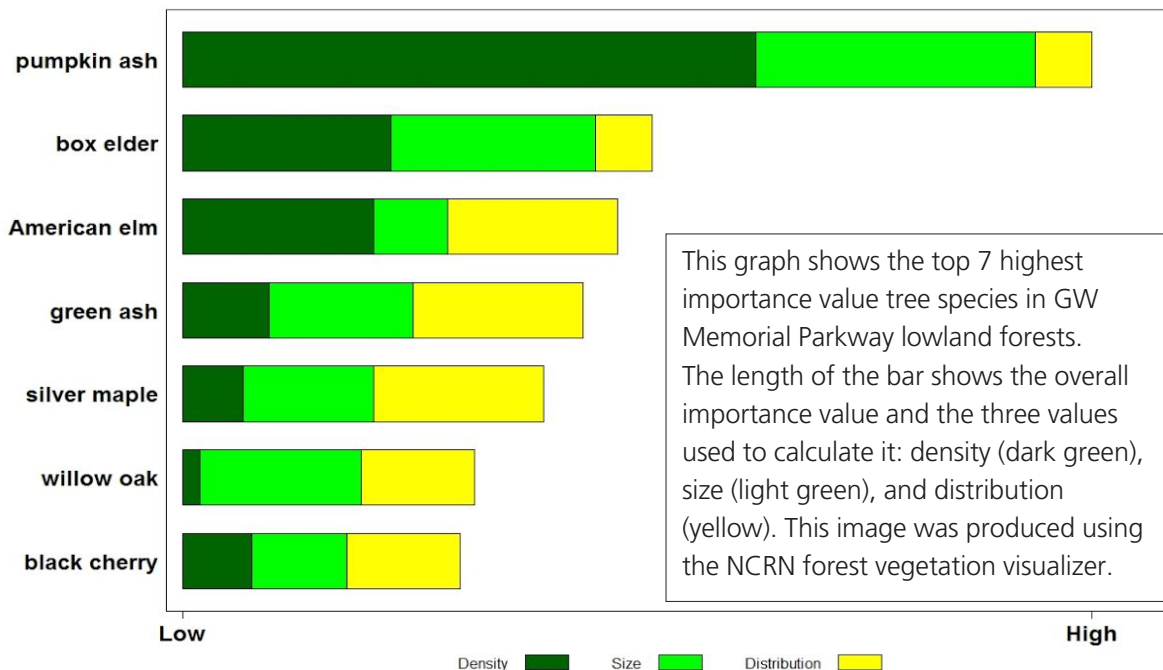
Tree Importance Value & Flooding

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 widespread they are).^{*} In this brief, Importance Value will be used to compare tree species composition in upland and lowland forest sites on the GW Memorial Parkway.

One of the most important ecological processes driving tree species variation at GWMP is flooding. Forests with repeated flooding (here: lowland forests) have unique soils and experience dynamic natural disturbances that result in vegetation composition distinct from the surrounding upland forests. In this brief we analyzed tree species composition to divide GWMP forests into uplands and lowlands.

Trees of Lowland Floodplains

Figure 1. Lowland Tree Species (Importance Value)

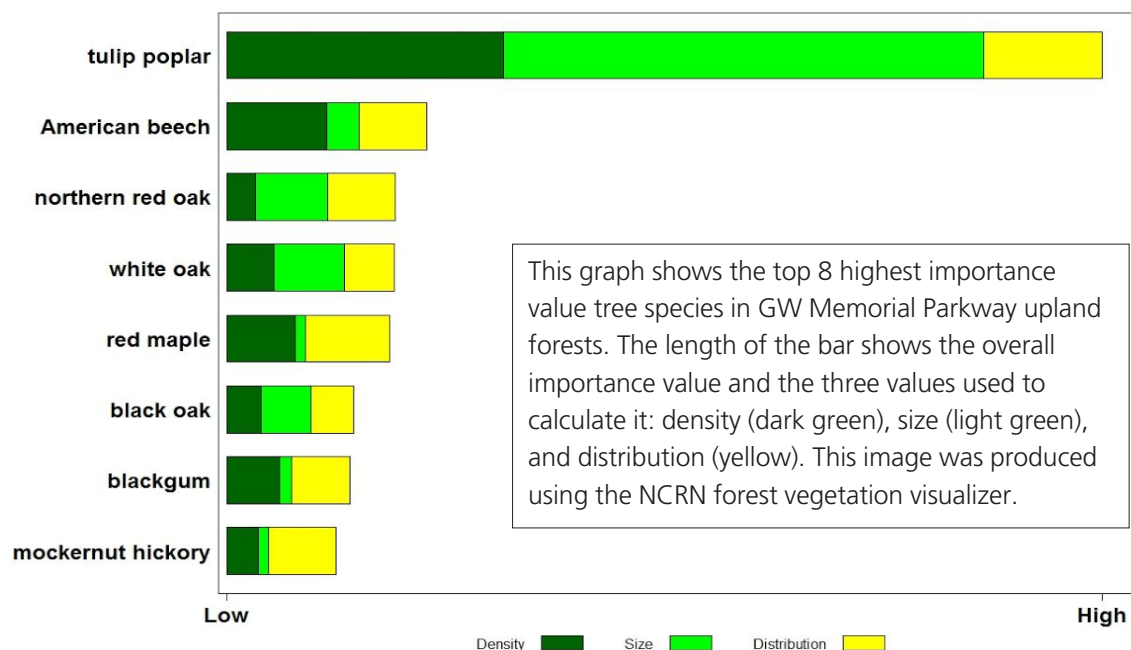


The lowland floodplains of GWMP include all areas adjacent to the river that experience repeated flooding events (including places that flood annually and places that flood once every 100 years).

Pumpkin ash (*Fraxinus profunda*) is the most “important” tree in GWMP lowlands, dominating due to its size and high concentration at

one site (Figure 1). Box elder (*Acer negundo*) is next in dominance, followed by American elm (*Ulmus americana*) which has a wider distribution, but smaller trees. Green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*), and willow oak (*Quercus phellos*) have similar distributions and sizes, but get progressively less numerous, and black cherry (*Prunus serotina*) falls last on the list with greater numbers, but smaller sizes.

Figure 2. Upland Tree Species (Importance Value)

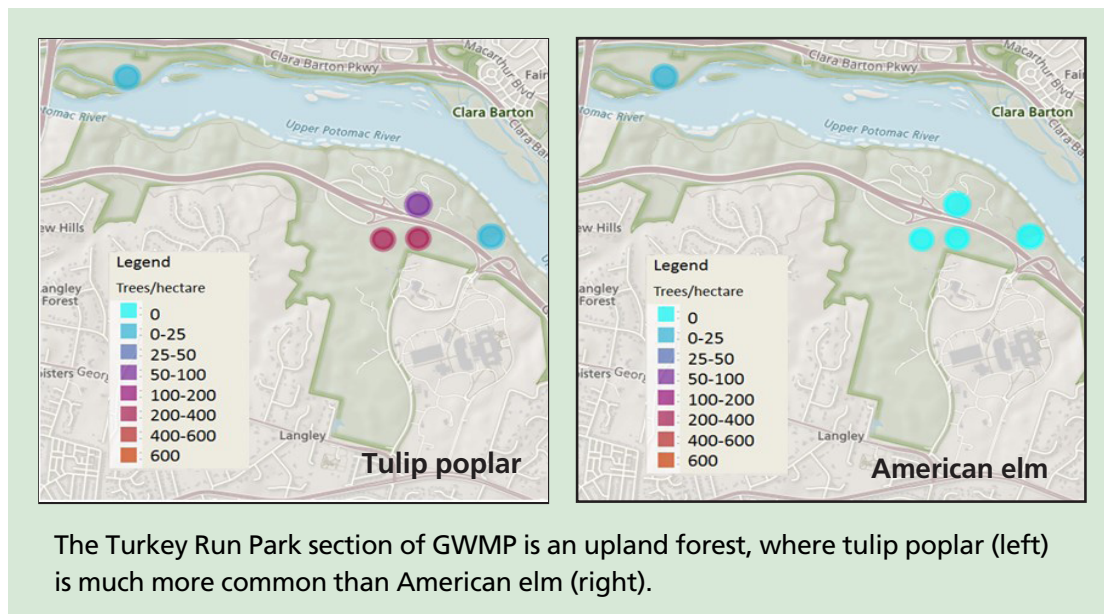


Trees of Uplands

Upland forests develop above and away from the river, in areas that do not routinely flood. As seen in Figure 2, GWMP's uplands are largely dominated by tulip poplars (*Liriodendron tulipifera*), which are numerous and large. American beech (*Fagus grandifolia*) is the second most dominant because of its number and distribution. It is closely followed by a series of oaks (northern red, white, black; *Quercus* spp.), which tend to be larger, interspersed with red maple (*Acer rubrum*), which is small in size, but large in spread and number. Blackgum (*Nyssa sylvatica*), and mockernut hickory (*Carya alba*) are the final important upland tree species, with high distribution and numbers.

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>.

*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>