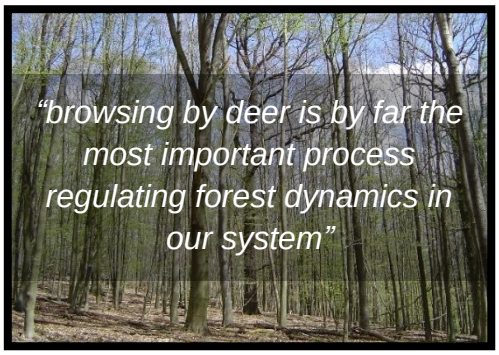
THE FUTURE OF OUR FORESTS: VWL WORKSHOP

SEPT 29, 2018

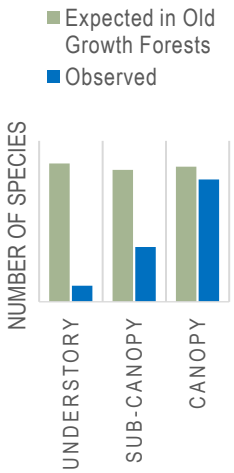
PRESENTATION SUMMARIES AND TAKE-HOME MESSAGES

Walter Carson | Biodiversity Collapse and the Future of the Eastern Deciduous Forest Biome



The Eastern forests of today bear little resemblance to their ancestral state following hundreds of years of human intervention. American chestnuts, formerly one out of every four canopy trees, are on the brink of extinction. Other upper canopy species, like oak and hickory, are disappearing from the understory, while beeches, ash, and hemlock are each losing battles to diseases or pests. Even sub-canopy species like tulip poplar, black cherry, and magnolia are flagging, too.

What is driving the loss of so many foundational species? Several processes have been implicated. These species losses may have something to do with the smaller and less-frequent canopy gaps that lead to lower understory light levels, the current or historical browsing of deer at high densities, the year-round suppression of fire, as well as the enduring legacy of historical clear-cutting.



Today, most eastern forests are secondary forests, meaning they have re-grown following logging (many have been clear-cut two, three, or four times). As such, remarkably little eastern forest is considered old growth[1]. Yet, even in patches of 'pristine' old growth, Dr. Carson's research has shown that species richness in the sub-canopy and understory are a fraction of that in the canopy; and that this pattern is seen in the old growth and secondary forests.

Dr. Carson and his research team explored several hypotheses as to why the forests understory is so depauperate[2]. Maybe understories with lower light levels and smaller canopy gaps favor fewer species that survive long periods of shade. Maybe "the ghost of herbivory past" has led to communities comprised of fewer, browse-insensitive species. Maybe the suppression of forest fires has failed to support fire-resistant species, like oaks and hickories.

Using a large-scale, experimental approach, Dr. Carson's team found strong evidence that deer browsing is the most impactful process influencing the biodiversity collapse of eastern forests (link, link, link). Deer eat almost everything, from forbs and herbs to seedlings and saplings, and leave only the most unpalatable species behind. However, the research also showed that removal of deer alone is not enough to see improvements in understory species richness. Only when combined with either prescribed burning or manual canopy gap creation did deer exclusion help restore understory species composition.

Dr. Carson claims to be an optimist, but his summary is disheartening: deer browsing is only getting worse; we can't restore deer predators; we can't start forest fires; and new diseases are arriving or spreading all the

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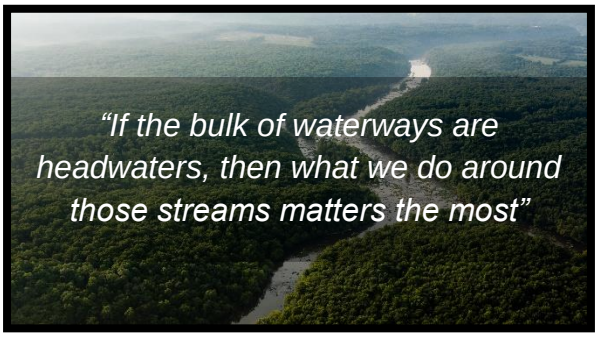
[1] old growth: characterized by "large trees and standing dead trees, multilayered canopies with gaps that result from the deaths of individual trees, and coarse woody debris on the forest floor" (Wikipedia)
[2] depauperate: "(of a flora, fauna, or ecosystem) lacking in numbers or variety of species." (Oxford Dictionaries)

time. On top of that, the overwhelming majority of forested land in the East is privately-owned, creating a patchwork of management goals that all but preclude a coherent management plan for large areas of forest. It is already unlikely that the Eastern forest biome of the future will look like anything we have seen before; nevertheless, it is up to private landowners to act as stewards. Active protection and restoration of remaining forest diversity is our best bet to mitigate the negative consequences resulting from biome-wide changes.

Jenny McGarvey | Importance of Trees and Forests for Water Quality: from Headwaters to the Chesapeake Bay



A watershed is made up of all the streams and tributaries that move water to the same point lower in elevation. The smallest streams, those highest in elevation, are headwaters – the start of the watershed. In fact, 80% of stream miles are considered headwater streams.

The Chesapeake Bay watershed is unique because it has the largest land-to-water ratio of any coastal water body. In practical terms, that means that water from ~64,000 square miles of land all drains to an area only 1/14 that size. Across the entire Chesapeake Bay watershed, about 23% of land cover is in development (and increasing), while about 12% is in agriculture (and decreasing), and the rest is in forest, wetland, or other cover types. Moreover, the Chesapeake Bay is surprisingly shallow. So when sediments and pollutants from runoff enters the bay, it clouds the water -- cutting off the light to photosynthetic sea-grasses -- and sparks algal blooms that ultimately remove most of the oxygen from the water. As a result, dead zones as big as 2.7 *cubic* miles can appear in the summer months.

Water may be filtered as it passes through a watershed, but only if it has time to leech deep into the ground; there, it accumulates as cleaned ground water. However, if the rain falls faster than it is absorbed by the soil, then runoff occurs. Forests have much greater absorption rates because their loamy soils act like a sponge. They also immediately return as much as 40% of rainfall back into the atmosphere via evapotranspiration. Forests also help take-up runoff pollution (e.g., excesses P and N from agriculture), provide cooling shade to streams, and supply a moderated input of nutrients (i.e., leaves) that can support a large web of wildlife.

The Bottom Line: In the long run, it is more expensive to treat water than to plant forest buffers around our streams or establish wetland areas. The consensus from hundreds of studies suggests that planting and maintaining 100 feet (or more!) of forested buffer on both sides of a stream is ideal.

Jenny is spreading the word about "**Forests for the Bay**," a project of the Alliance for the Chesapeake Bay.

If you want to learn more about how to plan and care for your woodland & riparian areas, visit them on the web (www.forestsforthebay.org)!

FORESTS FOR THE BAY