The Southern Maryland Chronicle

Forests growing over shale bedrock help fight climate change

28 October 2020

A swath of forests in the Appalachian Mountains in Pennsylvania, Virginia, New York and West Virginia store much more harmful carbon than surrounding forests and should be conserved in the name of climate change, a new study says.

The federal government-supported study by two researchers at Penn State University found that trees grow much faster on top of shale bedrock, allowing them to store 25% more carbon — and 55% faster — than trees living above the more prevalent sandstone.



The Ridge and Valley Province of Pennsylvania, like some Appalachian forests in other Bay states, grows forests over shale bedrock that may maximize carbon capture to fight climate change. Credit: Warren Reed / Bay Journal Media

The study, published in *Forest Ecology and Management*, also noted that forests growing over shale have more diversity in tree species. A greater variety of trees will help forests survive better when threatened by shifts in precipitation or invasive species whose populations are projected to increase in a warmer climate, the study found.

Researchers studied forest inventory data from 23,000 trees in the Appalachian Ridge and Valley Region of Pennsylvania. There are about 262,000 acres of forest on shale bedrock in that region. There are four times as many sandstone forests in the region.

Most of the shale forests are on public land, where policy makers in the Pennsylvania Department of Conservation and Natural Resources and the Pennsylvania Game Commission make management decisions. The researchers said similar ratios of productive shale forests exist throughout the Appalachian Mountains, from northern Georgia to southern New York.

"I have a lot of hope that Pennsylvania and other regions will start to capitalize on our resources in terms of carbon storage. It's a big tool in the toolbox," lead researcher Warren Reed said.

Data showing the difference between underlying bedrock has been available for decades, but had not previously been used to understand tree growth or as a possible method of fighting climate change, Reed said.

"I was surprised to find the magnitude of difference so strong in our Ridge and Valley Province," he said. On average, trees underlain by shale grew more than 19 feet higher than their counterparts in sandstone forests.



Trees that grow above shale bedrock, like those shown here, grow faster and capture more carbon dioxide, a gas that drives climate change, than the more common sandstone forests, researchers have found. Credit: Warren Reed / Bay Journal Media Scientists say trees are one of the most successful and cheapest ways of capturing carbon out of the atmosphere in the fight against global warming. As trees grow, they absorb and store carbon dioxide gas, which traps heat in the atmosphere. Trees soak up the gas and convert it to glucose and oxygen through photosynthesis. The faster that trees grow, the more carbon they capture. And trees above shale soil grow much faster. That's because shale breaks down into a soil with a finer texture, allowing trees access to more water during the growing season.

The greater diversity of trees in shale forests also makes them more resilient in dealing with climate change and invasive insects, such as woolly adelgids that are devastating native hemlocks and emerald ash borers that are leveling ash trees.

The study makes the case that shale forests should be high-priority candidates for management and conservation. For example, forest managers could target shale forests for conservation and carbon sequestration, said Margot Kaye, the other Penn State researcher on the project.

Meanwhile, less productive sandstone forests could be where recreation and wildlife habitat that involves cutting down trees is concentrated. Pennsylvania's public forests are a big producer of timber.

In Pennsylvania, the location of shale forests coincides with where hydraulic fracturing for natural gas is booming. Environmentalists have complained about the loss of trees from well pads, new roads and pipelines.

The newfound value of shale forests may also give private forest landowners an economic incentive to conserve their trees.

There are several private initiatives associated with climate change mitigation in the United States that pay landowners who keep their forests, which creates carbon credits to be applied elsewhere.

For example, in April, Amazon, in association with The Nature Conservancy, American Forest Foundation and Vermont Land Trust, announced a \$10 million program to help family forest landowners in the Appalachian Mountain areas of Pennsylvania and Vermont to sequester carbon by keeping their land forested.

Reed said researchers are already hearing from environmental groups on the East Coast and western states about the findings.

The National Science Foundation and the U.S. Department of Agriculture's National Institute of Food and Agriculture helped to finance the research.

Source: <u>https://www.indiatoday.in/trending-news/story/rare-black-panther-spotted-</u> <u>roaming-around-mountain-forest-in-india-viral-video-1735754-2020-10-28</u>