

West Virginia

Climate Impacts

Climate impacts, such as extreme weather, are already affecting the operations and yields of farmers, foresters, and other landowners, as well as other West Virginia residents. A large portion of residents live in flood zones, and in 2016, West Virginia experienced record rainfall and severe flooding from a “thousand-year storm.” Conversely, increasingly severe droughts could pose additional challenges for transportation on major rivers like the Ohio and Kanawha. In addition to crop loss, gully and soil erosion, reduced dairy production and livestock fertility, West Virginia risks experiencing many more 90°F + temperature days. Heat-related illness and death remain significant public health challenges for much of the state.

Geography

West Virginia's borders are almost entirely defined by rivers and ridges. It has 35 state parks and eight state forests, the latter of which are vital for carbon sequestration. Approximately 70-80 percent of West Virginia's total land area is filled with 12.1 million acres of forest land, which stores tons of carbon, are among the most biodiverse and resilient in North America. Forest growth alone accounts for more than 70 percent of the total annual terrestrial sequestration. Northeastern West Virginia has the highest area of forest land at 4.5 million acres with 24 percent in public ownership. Sustainable land and forest management is critical for its tourism industry and Appalachian conservation writ large.

Quick Facts



The Appalachian Basin, which includes West Virginia, can store approximately 20 metric gigatons of carbon dioxide.



The forests and urban trees in West Virginia remove 16 percent of all carbon dioxide emissions in the state, and 14 percent of all carbon emissions in the U.S.



In July 2011, the West Virginia Carbon Dioxide Sequestration Working Group provided a report on recommendations "with Respect to the Development and Widespread Deployment of Carbon Dioxide Sequestration throughout WV."



In March 2022, the West Virginia State Legislature passed a bill to establish standards and practices for carbon sequestration in the state.



Carbon Sequestration

Carbon sequestration is the process of storing atmospheric carbon dioxide—one of the leading greenhouse gases—for a long time. It is similar to carbon capture and storage (CCS), which focuses on technological means of carbon sequestration, and both have similar end goals of preventing carbon from entering the earth's atmosphere. It is one method of reducing the amount of carbon dioxide in the atmosphere and is an opportunity for climate change mitigation. Trees sequester carbon through photosynthesis and trees that grow rapidly, such as young trees, are preferred as they can sequester more carbon in a shorter timeframe than mature trees. This form of sequestration is called biologic carbon sequestration and refers to vegetation, soil, aquatic environments, and trees as storing carbon. Geologic carbon sequestration is the process of storing carbon dioxide in underground formations and is sometimes used in oil recovery processes to improve extraction. When trees or other organisms storing carbon die, their carbon is released. As of 2020, there were approximately 24 CCS facilities operating worldwide, 12 of which were in the U.S. These facilities operate in five industry sectors: chemical production, hydrogen production, fertilizer production, natural gas processing, and power generation.

Strategic Significance

Carbon sequestration initiatives are key components of removing carbon dioxide from the atmosphere, especially for heavy industry. It is not only an important tool to leverage in meeting our national climate emissions goals, it is also an economic opportunity. By 2050, 80 percent of carbon sequestration initiatives are projected to be deployed across manufacturing areas, such as cement, iron, steel, and large electricity plants. Growth in these initiatives is expected to skyrocket after 2030. According to one study, the cost of capturing and storing carbon through CCS technologies ranges from \$60 to \$300 per ton, whereas the cost of carbon sequestration from forest activities ranges from \$10 to \$150 per ton. Similarly, planting trees (biologic carbon sequestration) is a more affordable and effective means of carbon sequestration. Likewise, West Virginia is home to several outdoor recreation hotspots, including the newest U.S. national park, so maintaining and enhancing the landscape for tourism is essential for creating jobs and maintaining overall economic development.

West Virginia - Carbon Sequestration Activity Highlights

- The Department of Energy (DOE)'s National Energy Technology Laboratory (NETL) is DOE's only government-owned, government operated national lab. One of its three sites is located in Morgantown. NETL's **Regional Carbon Sequestration Partnerships (RCSP) Initiative** aims to develop carbon storage and technology programs. West Virginia is split between the Midwest Regional Carbon Sequestration Partnership and the Southeast Regional Carbon Sequestration Partnership.
- In 2020, West Virginia University professor Debangsu Bhattacharyya was awarded funding for four DOE carbon capture related projects. Professor Bhattacharyya is a nationally recognized leader in clean energy research and development.
- In 2021, the **Family Forest Carbon Program**—a product of the American Forest Foundation and the Nature Conservancy—was launched in West Virginia to pay family and individual small forest owners to implement sustainable forest health practices to increase the amount of carbon sequestered and stored on the land.
- According to the **West Virginia State Forest Action Plan** (2020), forest conservation and management helps to store 12.7 million tons of carbon dioxide with a value of \$586.5 million.
- The West Virginia Division of Forestry also launched its **Forest Stewardship Program** to support similar private landowners interested in managing their forest land sustainably.

Select Activities from West Virginia Federal Delegation

- In March 2021, Senators Joe Manchin (D-WV) and Shelley Moore Capito (R-WV) introduced the **Carbon Capture Modernization Act** which would advance carbon capture technologies at coal plants. Companion legislation in the House was introduced by Representatives David B. McKinley (R-WV), Carol Miller (R-WV), and Alex Money (R-WV).
- In July 2021, Senator Manchin, introduced the **Energy Infrastructure Act**, which includes provisions for carbon capture and storage.
- In September 2021, Senators Manchin, John Barrasso (R-WY), Angus King (I-ME), and Roger Marshall (R-KS) introduced **America's Revegetation and Carbon Sequestration (ARCs) Act of 2021**, which aims to "restore ecosystems and boost carbon storage and sequestration through tree planting, fire risk reduction project, and expanded use of forest products and new wood technologies."
- In February 2022, Senators Manchin, Barrasso, Dick Durbin (D-IL), and Marsha Blackburn (R-TN) introduced the **Department of Energy (DOE) Science for the Future Act of 2022**, which, among other things, would establish a Carbon Oxide Sequestration Research and Geologic Computing Initiative at DOE.
- In July 2022, Senator Manchin joined nine Senate colleagues in urging DOE to implement the Direct Air Capture (DAC) Hub program established under the bipartisan **Infrastructure Investment and Jobs Act** "the way Congress intended."