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New efforts underway to combat climate change through carbon sequestration using New Mexico's forests

Collaboration between EMNRD, the University of Maryland, NASA's Carbon Monitoring System, and the University of New Mexico to support research project

SANTA FE – The Energy, Minerals and Natural Resources Department (EMNRD) Forestry Division and partners announce a new project aimed at expanding New Mexico's capacity to meet Gov. Lujan Grisham's commitment to addressing climate change and energy waste prevention, and directly informing efforts to grow the state's natural carbon sinks.

Carbon dioxide is the most commonly produced and abundant greenhouse gas in the Earth's atmosphere. Through natural processes, carbon dioxide is removed from the atmosphere and stored (sequestered) in plants and soils called sinks. New Mexico has about 16.7 million acres of forest land that has the potential to reduce the amount of carbon dioxide in the atmosphere and help to offset greenhouse gas emissions. Increased and targeted management of the State's forests can increase the amounts of carbon that is stored through these natural processes, but first, we need to measure the amount and rate that New Mexico's forests are currently storing carbon.

The Forestry Division received $99,000 in funding through the United States Climate Alliance Natural and Working Lands Technical Assistance Fund and the United Nations Fund, Inc. , which emphasize the development of carbon monitoring to better understand the role of our forests, rangelands, and agricultural lands as carbon sinks in New Mexico and the greater southwest region. This project will harness the ongoing investment of NASA's Carbon Monitoring System (CMS) in research development while ensuring the results reflect the unique ecosystems in the southwestern U.S. and can directly inform New Mexico's policy tools and commitments

Dr. Jeremy Klass, project lead and Natural and Working Lands Coordinator with the Forestry Division, and an Adjunct Professor of Biology at the University of New Mexico, said, "There is

very little data estimating the carbon pools and rates of carbon sequestration of New Mexico's lands. Precise and accurate estimates of carbon storage and fluxes are critical for guiding land management, informing greenhouse gas reduction initiatives, and developing carbon accounting systems."

The Hurtt Laboratory at the University of Maryland will work closely with EMNRD to provide baseline data for the amount of carbon sequestered in New Mexico's forests, and historical annual estimates of yearly forest carbon fluxes from the state's policy baseline year according to the Paris Climate Agreement, as well as future forest carbon sequestration options. The project coincides with the White House's announcement of the formation of the Greenhouse Gas Monitoring and Measurement Interagency Working Group.

"I am hopeful that NASA CMS will contribute to this broadly and that our work with states on high-resolution forest carbon monitoring will become a model for the working group and nation," said Dr. George Hurtt, Professor of Geographical Sciences and Science Team Leader of the NASA CMS.

Dr. Marcy Litvak, Professor of Biology at the University of New Mexico, is the Primary Investigator of the New Mexico Elevation Gradient of Flux Towers, funded by the Department of Energy through the Ameriflux Management Project. The nine instrumented towers in this network have been measuring the amount of carbon that enters and leaves in important ecosystems across our state since 2007. Dr. Litvak will lend her expertise in ecosystem dynamics to the research group, which will use the network of flux towers to help the project team parameterize and refine the CMS model output and aid in scaling the data relevant to our forested ecosystems.

"I am excited about this new effort. Understanding how much carbon our natural and working lands in New Mexico can store, how sensitive these carbon stores are to climate and disturbance, and if they can be managed to sequester more carbon, is a crucial component of statewide efforts to move toward carbon neutrality in the coming decades," said Dr. Litvak. "Working with EMNRD and the Hurtt Lab's implementation of CMS provides an extraordinary opportunity to compare model predictions of carbon balance with direct measurements from to inform policy-making efforts like those of EMNRD".

This project will address one of the goals of the Natural and Working Lands (NWL) Climate Action Team as outlined within the five-year plan to identify and implement strategies for the collection and use of carbon sequestration and emission data from New Mexico's NWL to inform improved land management practice outcomes and to contribute to the state's climate stabilization goals.

The applicability of the knowledge and data outcomes from this effort has regional, political, and sectoral implications in mapping and modeling forest carbon stocks for the first time in arid climates. The progression and application of the CMS fills a huge data void that is desperately required to evaluate the ability of forested systems to serve as natural climate solutions in arid climates throughout the globe.

Additional information on the project can be found at the following links.

NASA CMS project:
https://carbon.nasa.gov/

New Mexico Elevation Gradient (NMEG) of Flux Towers:
http://www.litvaklab.org/new-mexico-elevation-gradient.html

High-resolution Forest Carbon Modeling, Global Ecology Lab, Dept. Geographical Sciences, University of Maryland:
https://carbonmonitoring.umd.edu/

New Mexico Climate Change Task Force:
https://www.emnrd.nm.gov/ecmd/climate-change-task-force/

Governor Lujan Grisham's Executive Order (2019-003) addressing climate change and energy waste prevention:
https://www.governor.state.nm.us/wp-content/uploads/2019/01/EO_2019-003.pdf

Carbon flux towers monitor ecosystem processes by quantifying carbon, energy, and water balances in semi-arid biomes across six major biomes in New Mexico. This flux tower is in a piñon-juniper woodland on the Department of Energy, Ameriflux Management Project. More information can be found at http://www.litvaklab.org/.
Photo: Marcy Litvak, Litvak Lab.

The Global Ecosystem Dynamics Investigation Lidar (GEDI) is housed on the International Space Station and uses waveform lidars to measure the three-dimensional structure of forests. Photo courtesy: NASA CMS.

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