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For Immediate Release
News Release

New Research Reveals Massive Carbon Losses From Annual Grass Invasion in Rangelands

Study highlights the connection between soil carbon, vegetation management, wildfire and climate change mitigation

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Cary, N.C, November 12, 2024 — New research published in Communications Earth & Environment, a Nature Portfolio journal, reveals that the conversion of native perennial shrublands to annual invasive grasslands in the western United States results in significant losses of soil carbon. This finding has important implications for rangeland management practices and global carbon sequestration efforts.

The robust research, a collaboration between scientists from the United States Geological Survey (USGS) and Environmental Science U.S. LLC (doing business as Envu), provides the first comprehensive assessment of the impact of this conversion on soil carbon stocks. Read the full study here.

“This research shows that a disturbance such as exotic annual grass (EAG) invasion can quite rapidly deplete soil carbon that may have built up over thousands of years,” said Dr. Harry Quicke, Envu scientist and one of the paper’s authors. “The scale of this problem is immense; over 50 million hectares (123 million acres) have already been impacted by invasive grasses, and an additional 363,000 hectares (897,000 acres) are being converted each year. This represents a significant loss of soil carbon globally.”

It also represents a loss of 51 metric tons of carbon per hectare, equivalent to 187 metric tons of carbon dioxide equivalent (CO_2eq) per hectare, or 75 metric tons of CO_2eq per acre.

The two-year study involved collecting and analyzing over 1,000 soil samples from three locations in the sagebrush steppe, a vast ecosystem that spans much of the western U.S. The researchers

sampled soil cores down to a meter, a key difference from previous studies that only sampled down to 30 centimeters or less. This deeper sampling allowed the researchers to capture a more complete picture of soil carbon storage and the impacts of grass invasion.

The researchers found that the conversion of perennial shrublands to annual invasive grasslands resulted in a 42%-49% reduction in soil carbon. They also found that wildfire and grass invasion had a similar impact on soil carbon stocks, a surprising finding that challenges previous assumptions about the relative impacts of these disturbances.

“Our findings show that maintaining intact sagebrush steppe by protecting against the annual grass-fire cycle could be a highly effective ‘nature-based’ solution to the global greenhouse gas problem,” explained Dr. Matthew Germino, a USGS research ecologist and the principal investigator of the study. “Management strategies aimed at stopping the ongoing conversion of deep-rooted, diverse, native perennial systems to exotic grass-dominated systems could help avoid soil carbon losses and provide many other benefits. Protecting intact sagebrush steppe can also improve wildlife habitat, increase forage production and reduce wildfire risk.”

Phase 2 of the ongoing research collaboration, which expands the scope of the study to include more locations, is already underway. Visit this page on USGS.gov for more information on the research and its implications.

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Envu was founded in 2022, a company built on years of environmental science experience, for the sole purpose of advancing healthy environments for everyone, everywhere. Envu offers dedicated services in: Professional Pest Management, Forestry, Ornamentals, Golf, Industrial Vegetation Management, Lawn & Landscape, Mosquito Management, and Range & Pasture. Envu collaborates with customers to design innovative solutions that meet their requirements today and well into the future. The Envu portfolio consists of over 180 trusted and well-known brands. The company employs 900 people, operates in 100 countries, and has four global innovation hubs. For additional information, visit www.envu.com.

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