

ecological insights

CORPORATION

Ecological Insights Corporation works with farming, ranching and conservation communities to advance the science and education of ecosystem health and regeneration.

Dr. Rebecca Phillips designs carbon cycle research and education projects to raise awareness of the role of regenerative agriculture in sequestering carbon. Based in Hazelton, North Dakota, Ecological Insights is a non-profit, 501(c)3 corporation.

services

- Teacher professional development courses and field workshops
- Soil coring, nutrient analyses, soil health, and physicochemical data collection
- Carbon flux measurement, modeling and hypothesis testing
- Carbon in the classroom curriculum design
- Carbon monitoring and mapping

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Managed Grazing for Rangeland Health and Profitability: Ranching to Optimize Carbon Capture

by Dr. Rebecca Phillips
December 7, 2021

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Outline

- Introduction
- Perceptions around cattle, carbon and methane
- The rush to buy North Dakota rangeland carbon
- Reframing the issue—thinking holistically about rangelands to include multiple ecosystem services and benefits
- Summary

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M.S. Rangeland Ecology
Ph.D. Environmental Science & Engineering

www.ecologicalinsights.org/rebeccaphillips

Over 50 peer-reviewed research publications centered on carbon and nitrogen cycling in forest, wetland, rangeland, and cropland ecosystems.

Supported from 1997 by NASA, USFS, DOE, USDA, EPA, NGOs

Professional Experience:

Landcare Research, New Zealand	University of North Carolina
University of North Dakota	Colorado State University
University of Michigan	Mississippi University for Women
USDA Agricultural Research Service	Ecological Insights Corporation

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Current and Prospective Collaborators

ND Game & Fish

ND Natural Resources Trust

ND Grazing Lands Coalition

University of North Dakota



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USDA

Turtle Mountain Band of Chippewa Indian Tribe

Turtle Mountain Community College

Oil and Gas Companies in the Bakken

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The Issue:

Making sense of the press around carbon, cattle & methane

1. Difficult to discern fact from fiction
2. Why is the beef industry blamed for climate change?
3. Why are carbon buyers interested in North Dakota soil carbon?
4. What the press is missing: The importance of grazers as integral to rangeland ecology
5. What is needed: Education and engagement among producers and SBARE on this topic.

North Dakota should be proactive in helping ranchers understand the role of carbon in ranching and how they might benefit from emerging carbon markets

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Why aren't we marketing the environmental benefits of raising beef on ND rangelands?

For example,

— TIME

PRODUCTION HOW TO SUBSCRIBE TO ME: BEGINS THE FUTURE OF MEAT [VIEW IN](#) [ENGLISH](#)

'Cows Are the New Coal' How the Cattle Industry Is Ignoring the Bottom Line When it Comes to Methane Emissions



This article summarizes an international report (FAO) that assigns metrics to different protein sources. The title of this article does not accurately reflect the data in the report and does not highlight wide differences among countries.

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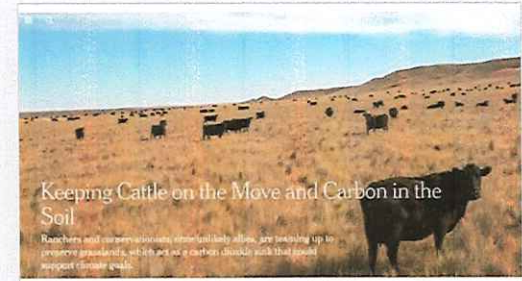
Some journalists are illustrating the importance of managed grazing to rangeland health, productivity and carbon capture

Raylene Nickel, Successful Farming
Benjamin Ryan, New York Times

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Carbon Buyers

Middlemen, known as verifiers, aggregators and investors, are betting on the price of carbon is going up
Shouldn't profits primarily benefit the ranchers that grow and manage carbon?

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Why are so many companies being formed to buy rangeland carbon?

1. Carbon Sequestration Tax Credit (45Q)
2. Investors think the market price in the US, like Europe, may go up
3. Grazed grasslands are sinks for atmospheric carbon dioxide
4. Carbon capture facilities cannot capture atmospheric carbon dioxide like grasslands

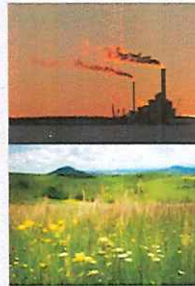
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Currently \$50 /ton CO₂
This is \$183/ton Carbon

Proposed legislation:
\$85/ton CO₂
\$311/ton Carbon

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Two common ways to capture or drawdown carbon dioxide from the air

1- Capture emissions at stacks, Direct Air Carbon Capture

2- Photosynthesis to drawdown carbon dioxide in the atmosphere

STACKS VS. LIVING PLANTS

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STACKS
Energy → CO₂ + Water
Energy → electric, natural gas, thermal, etc. \$100-200/ton CO₂
CO₂ → at stacks concentration 0.015
Stored as CO₂ in deep veins, 1 mile below

"Offsets" emissions that would normally be emitted at stacks

LIVE PLANTS
Energy → CO₂ + Water
Energy → solar
CO₂ → atmosphere concentration 0.0004

Stored as organic matter in soil, upper 2 feet

Removes or draws down CO₂ in the air—can lower CO₂ from 0.0004 to 0.0002

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Live Plants vs Stacks

- Grasslands sequester carbon belowground as organic matter. Rates depend on species, climate, soils, grazing management
- Carbon removal rates reported from 0.2 to 0.6 tons of carbon per acre per year in NGS grasslands
- Capturing concentrated CO₂ at stack means high rates of carbon capture
- An 80% capture rate would mean 80% of the emissions that would have gone to the atmosphere were captured

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Reframing the conversation

If we focus only on carbon or methane, we will likely miss opportunities to maximize producer benefits and highlight the importance of ND ranchers to the sustainability of multiple ecosystem services

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Thinking holistically about carbon, cattle and sustaining ND grassland resources.



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Group Wants New Conservation Program

Farm Groups Join to Seek at Least \$100 per Acre for USDA Conservation Program

10/7/2021 1:55 PM CDT



By
Chris, DFN Ag Policy Editor

Connect with Chris:
A collection of farm groups and agricultural leaders on climate issues have joined together to create a new group seeking at a minimum \$100 per-acre payments to farmers for ecosystem practices that improve soil health and water quality. (DFN file photo)

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Promoting practical information exchange

- **Education** that address producer questions such as: What is carbon? How is it measured? How much carbon is on my land? What does carbon have to do with soil health?
- **Management** research that shows how grazing management and other factors affect rates of carbon and methane uptake and other ecosystem services.
- **Statewide forum** for producers interested in discussing carbon markets, rangeland resource management incentives, etc.

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Summary:

The importance of carbon in rangeland ecosystems needs to be communicated across the state. Opportunities for native rangelands to produce additional income through carbon and conservation services should not be overlooked. We can discuss measurements and carbon cycle science in detail. The state needs to consider if rangeland ecosystem services, including carbon sequestration, should be included as a research and education priority at multiple levels.



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