

Managing Agricultural Greenhouse Gases: The Basis of GRACEnet

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GRACEnet – What is it?

Greenhouse gas

Reduction through

Agricultural

Carbon

Enhancement

network

GRACEnet – What is it really?

**A dedicated network of ARS scientists at
~30 locations**

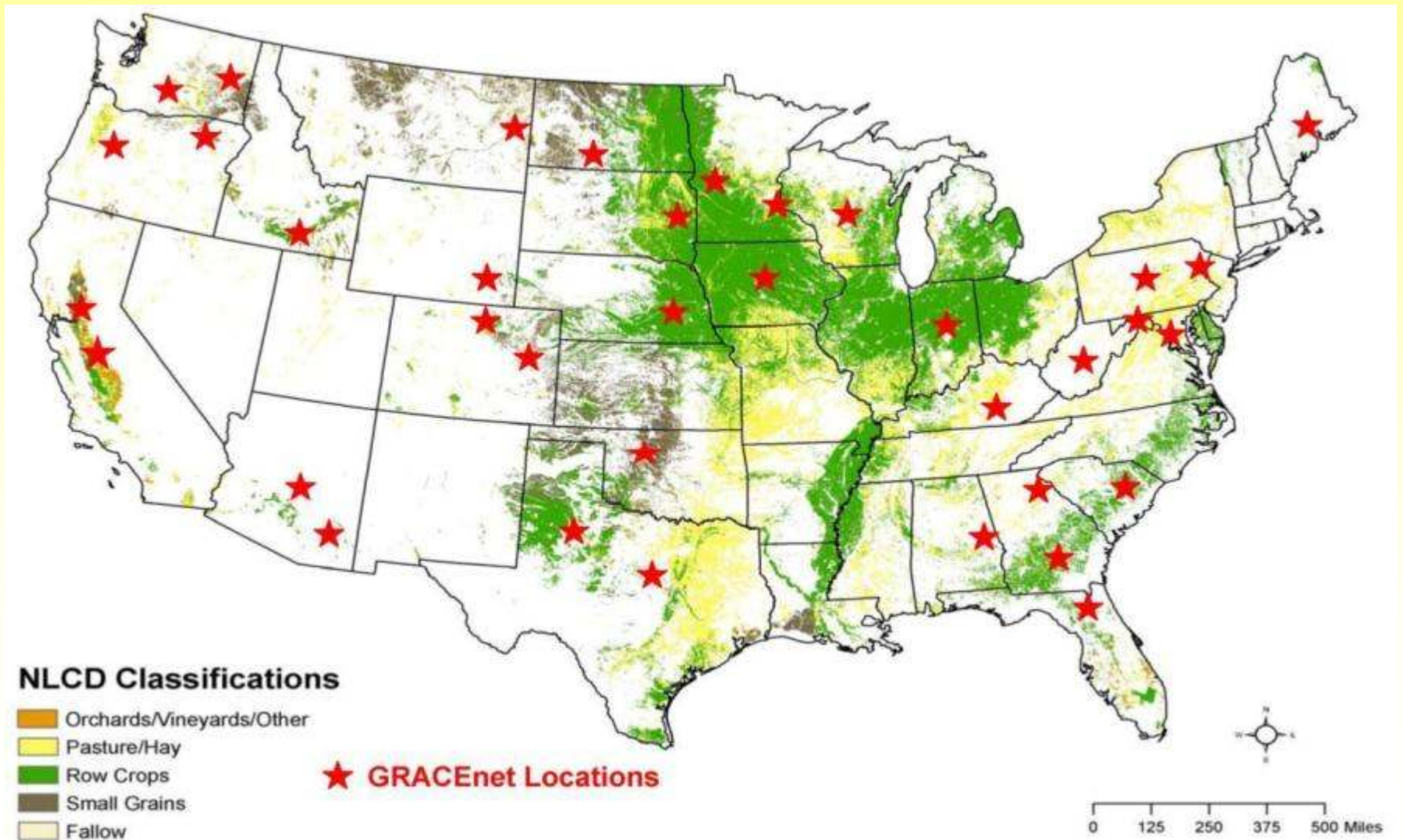


Prosser WA



Gainesville FL

GRACEnet – Locations



Objectives

1. Evaluate the status and direction of change in soil organic C from existing typical and alternative agricultural systems



Objectives

2. Determine the net GHG emission (CO_2 , CH_4 , and N_2O) from existing typical and alternative agricultural systems



Objectives

3. Determine the ancillary environmental responses (e.g. water, air and soil quality) from agricultural systems developed to reduce GHG emission and increase soil C storage



Approach

➤ **four location-specific scenarios**

1. Business as usual

Typical agricultural
management practices

Typified by a majority of
producers in the region

May be many variations
on typical practices



Lincoln NE



Brookings SD



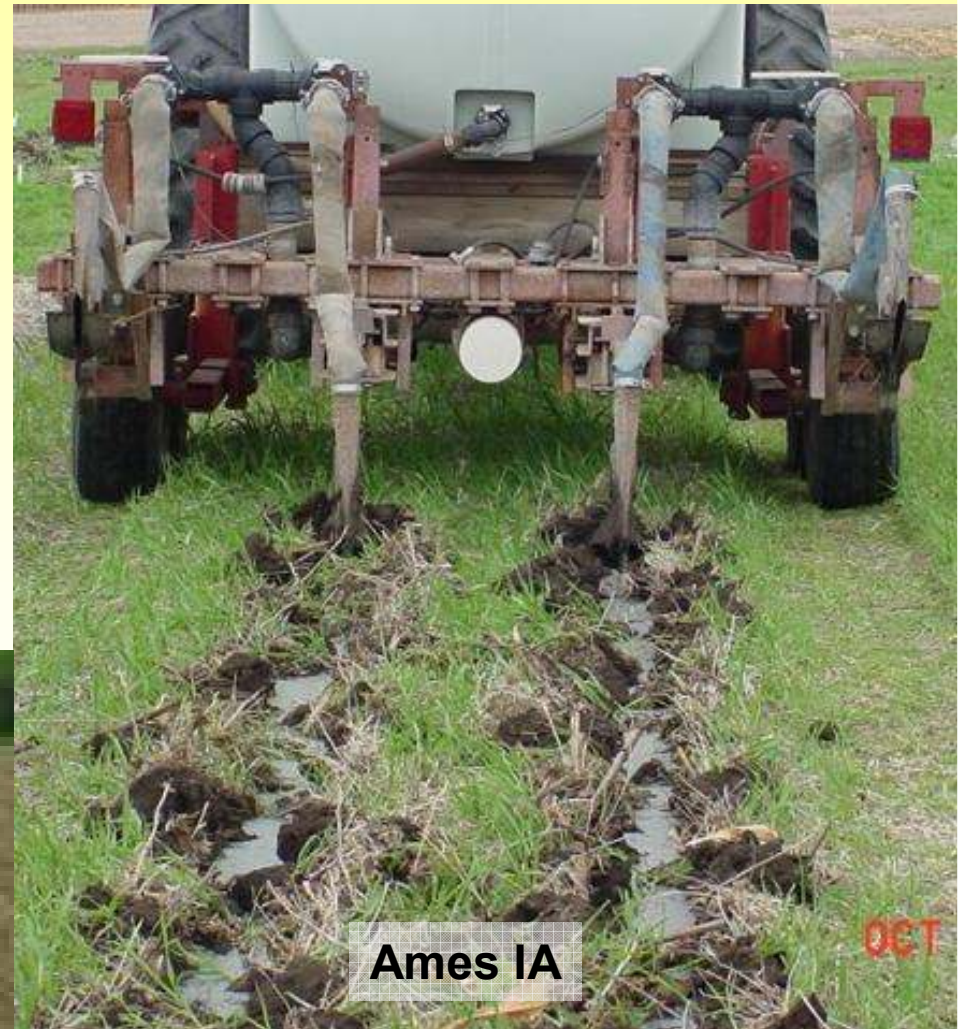
Orono ME

Approach

➤ **four location-specific scenarios**

1. Business as usual

2. Maximizing soil organic carbon sequestration rate



Approach

➤ **four location-specific scenarios**

1. Business as usual

2. Maximizing soil organic carbon sequestration rate

3. **Minimizing net GHG emission**



Mandan ND

Approach

➤ **four location-specific scenarios**

1. Business as usual
2. Maximizing soil organic carbon sequestration rate
3. Minimizing net GHG emission
4. **Maximizing environmental benefits**

Methodology

Chamber methods for CO₂, CH₄, and N₂O



Ames IA

Beltsville MD

Protocols

www.ars.usda.gov/gracenet

National Program 212: Climate Change, Soils, and Emissions

GRACEnet

- 1 - [GRACEnet Overview](#)
- 2 - [GRACEnet Sampling Protocols](#)
- 3 - [Reference Materials](#)
- 4 - [GRACEnet Participants](#)
- 5 - [Photo Gallery](#)
- 6 - [GRACEnet Data Entry Template](#)

GRACEnet Sampling Protocols

Sampling Protocols (2010)†

R. F. Follett (editor)

Protocols

www.ars.usda.gov/gracenet

Chapter 1. [Guidelines for Site Description and Soil Sampling, Processing, Analysis, and Archiving](#) ----- Pages 1-1 to 1-5
Mark Liebig, Gary Varvel, and Wayne Honeycutt

Chapter 2. [Plant Sampling Guidelines](#) ----- Pages 2-1 to 2-10
Jane Johnson and Jack Morgan


Chapter 3. [Chamber-Based Trace Gas Flux Measurements](#) ----- Pages 3-1 to 3-39
Tim Parkin and Rod Venterea

Chapter 4. [Micrometeorological Measurements](#) ----- Pages 4-1 to 4-10
John Baker and Bruce Kimball

Chapter 5. [Guidelines to Populate the GRACEnet Database Template](#)-----Pages 5-1 to 5-4
Steve Del Grosso, Jeffrey White, David James, and Greg Wilson

Products

1. A national database of GHG flux and soil organic C storage

USDA United States Department Of Agriculture
Agricultural Research Service GraceNet 

Home Comments

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Locations Crops Management Amendments Grazing Soil Climate Spatial

Tillage: Organic

Residue Removal: Management:

GraceNet Scenario: Nitrogen Addition:

Select Table to Display:

Display Selected Data

Download All Data

Download GraceNet Spreadsheet

GraceNet Web Site

Treatment ID	Date	Detailed Crop Management Practices
MDFSP_1.1	01/01/2007	3 Year Synthetic No-Till Corn-Soybean-Wheat/Soybean rotation; nutrient: synthetic; weed management: herbicide
MDFSP_1.3	01/01/2005	3 Year Synthetic No-Till Corn-Soybean-Wheat/Soybean rotation; nutrient: synthetic; weed management: herbicide
GAJPCSR1_F1H0	04/11/1994	Mineral N, Unharvested
GAJPCSR1_F1H1	04/11/1994	Mineral N, Low Intensity Grazing
GAJPCSR1_F1H2	04/11/1994	Mineral N, High Intensity Grazing
GAJPCSR1_F1H3	04/11/1994	Mineral N, Hayed
GAJPCSR1_F2H0	04/11/1994	Clover N, Unharvested
GAJPCSR1_F2H1	04/11/1994	Clover N, Low Intensity Grazing
GAJPCSR1_F2H2	04/11/1994	Clover N, High Intensity Grazing

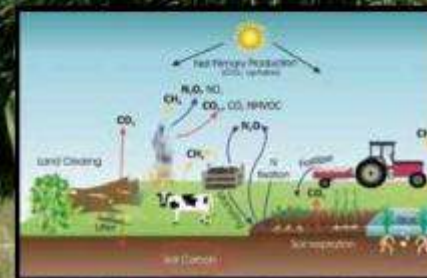
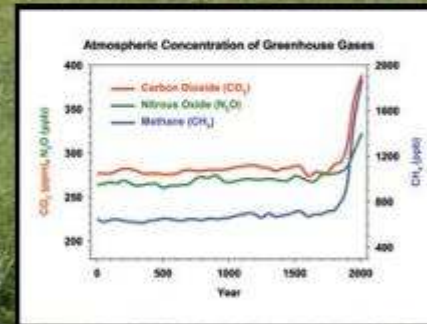
The next product



MANAGING AGRICULTURAL GREENHOUSE GASES

Coordinated Agricultural Research through GRACEnet to Address our Changing Climate

Edited by
Mark A. Liebig
Alan J. Franzluebbers
and Ronald F. Follett



GRACEnet

- ✓ **Networking and leveraging of resources among numerous ARS locations has fostered scientific advancements in quantifying (a) soil organic C sequestration and (b) emission of GHGs from agriculture**
 - **Created a cohesive, scientific culture within a multi-tasking organization**
 - **Developed a strong national and international reputation of scientific inquiry in the field of greenhouse gases (e.g. key member of the Global Research Alliance on Agricultural Greenhouse Gases – www.globalresearchalliance.org)**

