

COMET-VR

Carbon Sequestration Tool

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COMET-VR

Carbon Sequestration Tool

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GHGs Sources and Sinks

N₂O sources:

- **fertilizer applications**
- nitrogen fixing plants
- crop residue
- livestock waste
- residue burning
- cultivation of organic soils

CO₂ sources:

- lime applications
- **fossil fuel combustion**
- cultivation of organic soils

CH₄ sources:

- enteric fermentation
- rice production
- livestock waste
- residue burning

CO₂ sinks:

- **sequestration in soils**
- **sequestration in biomass**

What is COMET-VR?

- Voluntary Reporting of Greenhouse Gases-CarbOn Management Evaluation Tool
- Web-based interface to Century model
- Decision support for agricultural producers, land managers, and other agricultural interests

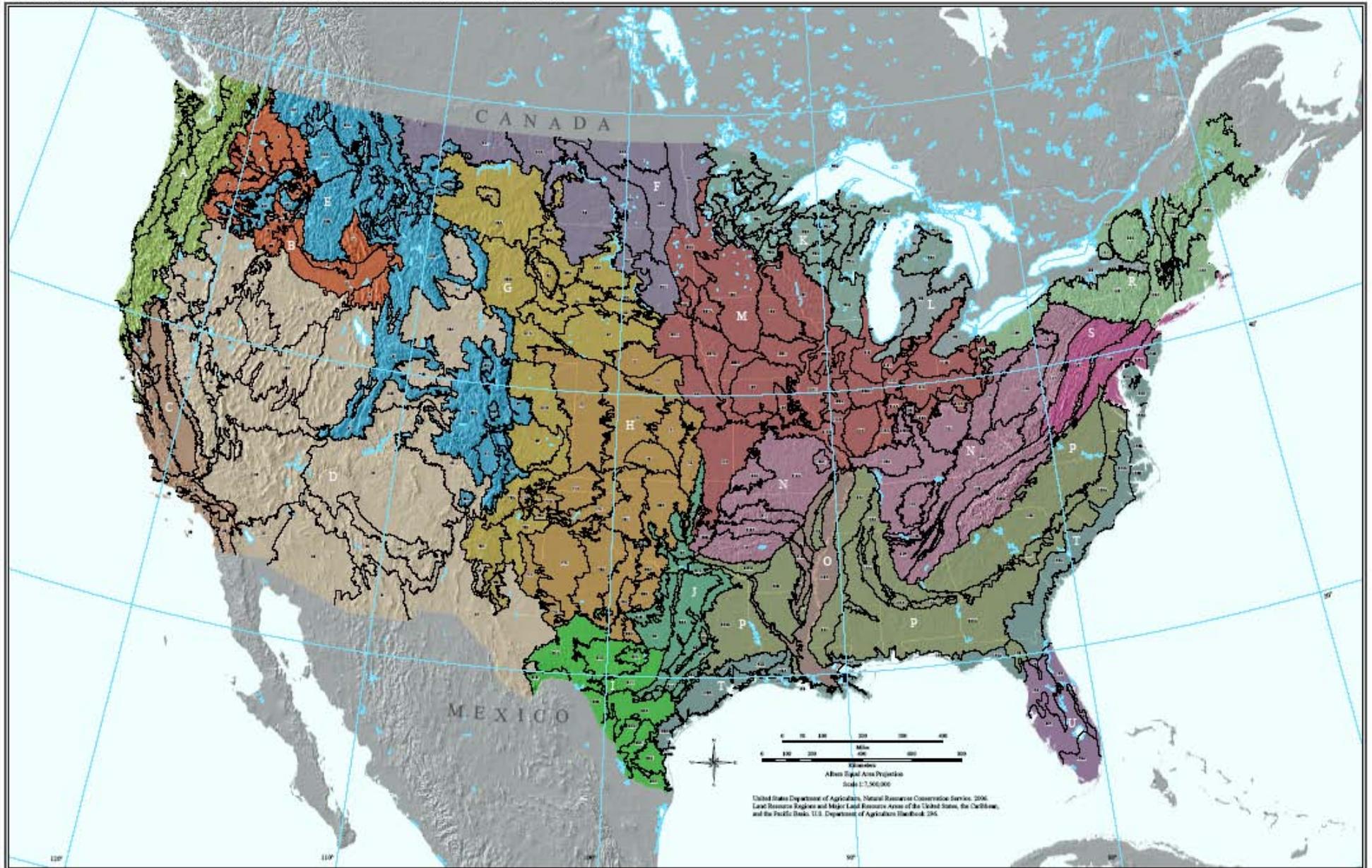
COMET-VR History

- **1980's – Century model researched and developed**
- **1995-2002 – State level and CRP soil carbon assessments (IA, IN, NE)**
- **2002 – COMET-VR development began**
- **2003-2004 – CSRA data gathering conducted**
- **2005 – COMET-VR made web available**
- **2006 – COMET-VR used in CSP**

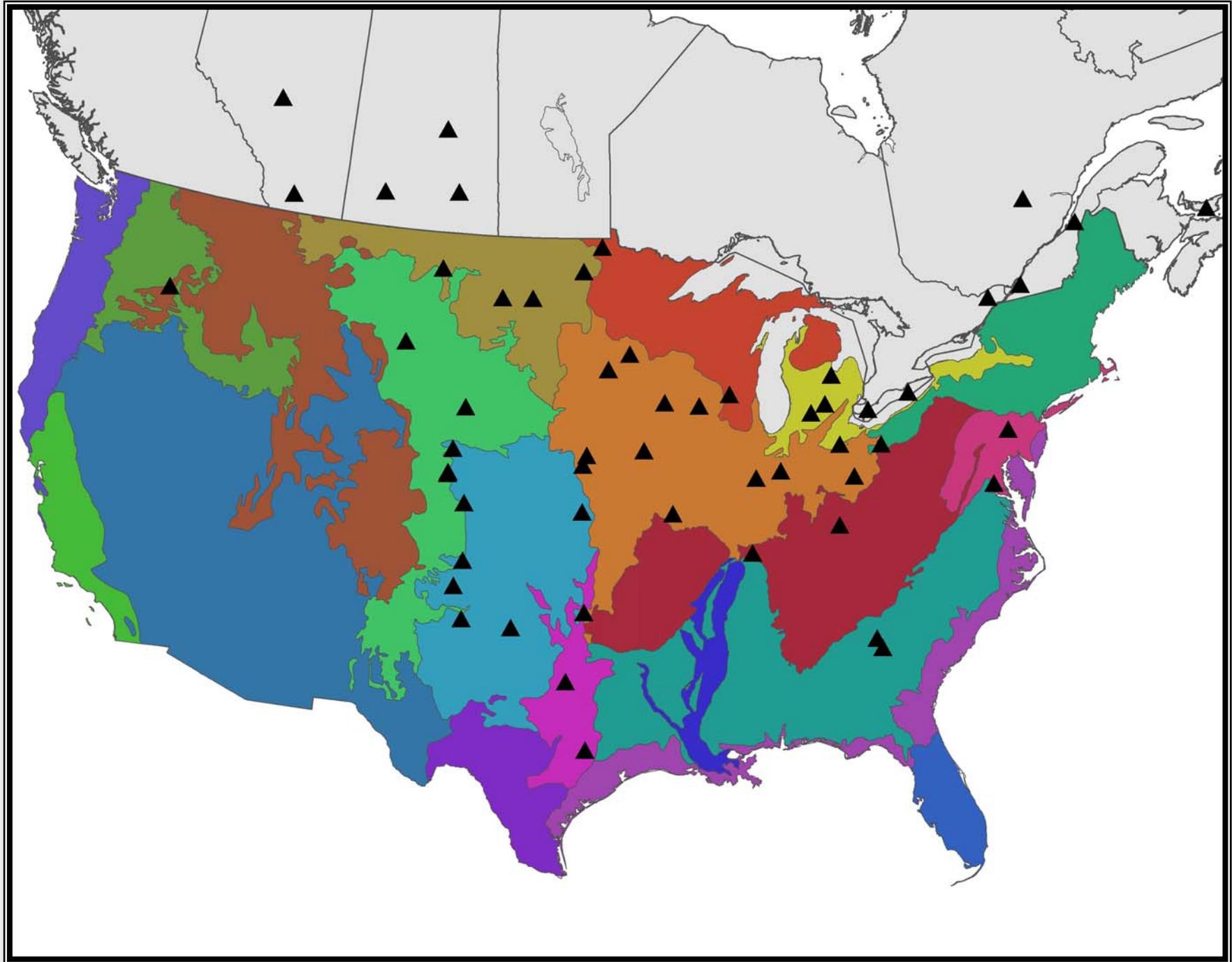
COMET-VR

- **Beta Version**
- 20 LRR's
- < 10 rotation choices per LRR
- 6 soil textures
- Century model w/ uncertainty estimate
- **Version 1.1**
- 226 MLRA's
- 20-40 rotation choices per MLRA
- 12 soil textures
- Century model w/ improved uncertainty estimate

LAND RESOURCE REGIONS AND MAJOR LAND RESOURCE AREAS FOR THE CONTERMINOUS U.S. - SIDE A



Agricultural Experiments



Required Responses to Utilize COMET-VR

- **Location**
 - State and County
- **Parcel Information**
- **Soils Information**
 - Soil Texture/Hydric Condition
- **Management History (crop rotations, tillage systems or grazing systems)**
 - Pre 1970's
 - 1970's-1990's
 - Base: 1990's-Current
 - Reporting Period: Current + 10 years

Online Tool for Agriculture & Range

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COMET-VR is the first OnLine Carbon Estimator Tool from Natural Resources Conservation Service (NRCS) and Natural Resource Ecology Laboratory, (NREL), Colorado State University, (CSU), developed in response to global climate change. This tool estimates carbon that is sequestered in the soil based on land management in agriculture. COMET-VR gives you an idea of the magnitude of agricultural management practices on carbon sequestration. The management practices covered are limited to the most predominant in the MLRA. NRCS specialists and the NRCS NRI were used to identify each practice.

Step 1. Enter the State Information: Select the State where the parcel is located from the list of State Names.

State Selection:

Select a State: ?

Indiana

Colorado

Connecticut

Delaware

Florida

Georgia

Idaho

Illinois

Indiana

Iowa

Kansas

Kentucky

Louisiana

Maine

Maryland

Massachusetts

Michigan

Next

USDA COMET-VR On 12007

Selection

Session Information: ?

- o ID: 1
- o ID: 2 122271884
- o ID: 3 122272107

Enter Session ID:

Location Information:

Parcel Information:

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Step 2. Enter the County Information: Select the County where the parcel is located from the list of County Names.

Indiana County Selection:

Select a County:

USDA COMET-VR Online 2007

GIBSON

FAYETTE

FLOYD

FOUNTAIN

FRANKLIN

FULTON

GIBSON

GRANT

GREENE

HAMILTON

HANCOCK

HARRISON

HENDRICKS

HENRY

HOWARD

HUNTINGTON

JACKSON

JASPER

?

Selection

Session Information: ?

- ID: 1
- ID: 2 122271884
- ID: 3 122272107

Enter Session ID:

Location Information:

- State:** Indiana

Parcel Information:

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Step 3. Specify your parcel's information: Enter the parcel name, parcel size, and measurement units.

GIBSON County, Indiana Parcel Selection:

Parcel Type?:

Agriculture 

Enter the reporting date:



**Enter the Total Number of
Parcels for this Entity:**



Enter a name (optional):



Measurement Units?:

English Metric 

Parcel Size?:

Acres 

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Selection

Session Information:

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Location Information:

- State:** Indiana
- County:** GIBSON
- Fips:** 18051
- MLRA:** 115A
- LRR:** M

Parcel Information:

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Step 4. Enter the Soil Information: Select the dominant soil texture and hydric information for your parcel.

GIBSON County, Indiana Soil Selection

Select the surface soil texture:

- sandy clay loam
- sandy loam
- silt
- silt loam
- silty clay
- silty clay loam

Is this a hydric soil? Select No or Yes:

No Yes

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USDA COMET-VR Online Tool Version: 1.0-012007

Selection

Session Information: ?

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Location Information:

- State: Indiana
- County: GIBSON
- Fips: 18051
- MLRA: 115A
- LRR: M

Parcel Information:

- Report Date: 2/1/2007
- Name: North Forty
- Size: 40 Acres
- Type: Agriculture

Soil Information:

- Texture: silty clay loam
- Hydric: N

Step 5. Enter the land management information: Choose a rotation for the four time periods. ?

The following cropping systems were identified as having the greatest harvested crop acreage in your county using production data from the National Agricultural Statistics Service and the NRCS Natural Resource Inventory. They may not be the most common cropping systems in your immediate neighborhood but are the most significant cropping systems in your county.

Please select the system that most closely resembles your land management practice. Choose a rotation that is most like your land management that produces a similar residue, and fertilizer application. Or select **Other**. Other represents the most dominate cropping system for your county according to current data.

GIBSON County, Indiana Management History for North Forty:

Choose A Rotation for each Management Time Period:

All Rotations

1. Landscape position and historical management:

- Livestock Grazing (pre 1970s)
- Lowland Non-Irrigated (pre 1970s)
- Upland Non-Irrigated (pre 1970s)

Sort By: Non-Irrigated Irrigated Grazing AgroForestry All

Number of Records: 3

All Rotations

2. 1970s through mid-1990s:

- Livestock Grazing: seasonal, heavy grazing, low fertilizer
- Livestock Grazing: year round, heavy grazing, low fertilizer
- Non-Irrigated: corn-soybean
- Non-Irrigated: corn-soybean-winter wheat
- Other

Sort By: Non-Irrigated Irrigated Grazing AgroForestry OTHER ALL

Number of Records: 5

Conservation Reserve Program (CRP) Enrollment during 1980s?

Select the CRP type:

- 100% grass
- grass/legume mixture
- None

Selection

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- ID: 3 122272107

Enter Session ID:

Location Information:

- State:** Indiana
- County:** GIBSON
- Fips:** 18051
- MLRA:** 115A
- LRR:** M

Parcel Information:

- Report Date:** 2/1/2007
- Name:** North Forty
- Size:** 40 Acres
- Type:** Agriculture

Soil Information:

- Texture:** silty clay loam
- Hydric:** N

Management History:

See Also

- [NRCS Energy Estimator for Tillage](#)
- [NREL Agroecosystems](#)
- [CASMGs Consortium for Agricultural Soils Mitigation of Greenhouse Gases](#)
- [ARS Research](#)
- [U.S. Agriculture & Forestry Greenhouse Gas Inventory](#)
- [Greenhouse Gas Reporting Guidelines](#)

All Rotations

3. Base (Current Management):

- Non-Irrigated: corn-oats-5 yrs grass/legume pasture
- Non-Irrigated: corn-sorghum
- Non-Irrigated: corn-soybean
- Non-Irrigated: corn-soybean-5 yrs legume hay
- Non-Irrigated: corn-soybean-winter wheat
- Non-Irrigated: corn-winter wheat

Sort Non-Irrigated Irrigated Grazing AgroForestry CRP OTHER
By: ALL

Number of Records: 35

All Rotations

4. 2007 Report Period:

- Non-Irrigated: corn-oats-5 yrs grass/legume pasture
- Non-Irrigated: corn-sorghum
- Non-Irrigated: corn-soybean
- Non-Irrigated: corn-soybean-5 yrs legume hay
- Non-Irrigated: corn-soybean-winter wheat
- Non-Irrigated: corn-winter wheat

Sort Non-Irrigated Irrigated Grazing AgroForestry CRP OTHER
By: ALL

Number of Records: 35

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- o Greenhouse Gas Guidance for FARMS and FORESTS
- o Draft 1605b Technical Guidelines
- o 1605b Voluntary Reporting Program
- o COLE Forestry Model
- o COLE Lite Forestry Model

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Step 6. Enter the land management information: Choose a tillage for the three time periods.

GIBSON County, Indiana Tillage History for North Forty

Enter the management history for this parcel: ?

Tillage For this Time Period:

Choose Tillage:

1970s through mid-1990s:

Intensive Tillage
Reduced Tillage
No Till Tillage

Base (Current Mgmt.):

Intensive Tillage
Reduced Tillage
No Till Tillage

2007 Report Period:

Intensive Tillage
Reduced Tillage
No Till Tillage

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Selection

Session Information: ?

- o ID: 1
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Session ID:

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Location Information:

- o **State:** Indiana
- o **County:** GIBSON
- o **Fips:** 18051
- o **MLRA:** 115A
- o **LRR:** M

Parcel Information:

- o **Report Date:** 2/1/2007
- o **Name:** North Forty
- o **Size:** 40 Acres
- o **Type:** Agriculture

Soil Information:

- o **Texture:** silty clay loam
- o **Hydric:** N

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Please Verify the information by reviewing the gray "SELECTION BOX" to the right before submitting.

GIBSON County, Indiana COMET-VR Submit Information:

Soil Carbon Calculation for Agriculture

If you find any problems with the information that you input, you can easily correct the problem by using the navigation links at the top of this form to jump back to the section needing correction. For example, If the acreage/hectare value for your parcel is incorrect, just click on the link "parcel". Then input the correct value and click on the next button. Review the Selection box to the right of the screen. The value should be corrected.

After correcting the information, click on the "Submit" link at the top of the page to return to the execution page.

When you click on the "Get Carbon" button you will be sending your information to the Century program to compute the predicted change in Soil Carbon for the parcel North Forty, GIBSON County, Indiana.

This is a complex calculation and may take a few seconds, so Please be patient.

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[Get Carbon](#)

Selection

Session Information: ?

- ID: 1
- ID: 2 122271884
- ID: 3 122272107

Enter
Session
ID:

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Location Information:

- **State:** Indiana
- **County:** GIBSON
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- **MLRA:** 115A
- **LRR:** M

Parcel Information:

- **Report Date:** 2/1/2007
- **Name:** North Forty
- **Size:** 40 Acres
- **Type:** Agriculture

Soil Information:

- **Texture:** silty clay loam
- **Hydric:** N

Parcel Description	
Parcel Type:	Agriculture
Total Parcels for this Entity:	1
Parcel Name:	North Forty
Parcel Size:	40 Acres
Location:	GIBSON, Indiana
Soil:	Non-hydric silty clay loam

Parcel Management History	
Historic:	Livestock Grazing (pre 1970s)
70s to 90s:	Non-Irrigated: corn-soybean; Intensive Tillage
Current:	Non-Irrigated: corn-soybean; Intensive Tillage
Report Period:	Non-Irrigated: corn-soybean; No Till Tillage

Predicted Change in Soil Carbon for the Parcel

Annual Change for 2007

	Carbon Change	Uncertainty ?	
		Avg Percent	
Total Tons Carbon per year:	1.93	19.14	
Total Tons CO2 Equivalent per year:	7.07	19.14	

Values recorded in English units. One **ton** of carbon is equivalent to 3.664 **tons** of carbon dioxide.

Dynamic Century Carbon ONLINE Tool - COMET-VR

Fuel and Fertilizer ?

Report Date: 2007

Parcel Description: **North Forty, GIBSON County, Indiana**

	1998 to 2007* Base (Current Management)	2008 to 2017* Reporting Period
No. 2 Diesel Use from Tillage	246.80 Total Gallons	68.00 Total Gallons
Nitrogen Fertilizer Use	3,547.30 Total Lbs	3,547.30 Total Lbs

* Values calculated from the Dynamic LRR database for 2007

Enter Actual changes in inputs for this parcel per Year* ?

	Base		Reporting Period	
No. 2 Diesel	<input type="text" value="0"/>	Gallons	<input type="text" value="0"/>	Gallons
Gasoline	<input type="text" value="0"/>	Gallons	<input type="text" value="0"/>	Gallons
Propane	<input type="text" value="0"/>	Gallons	<input type="text" value="0"/>	Gallons
Biodiesel	<input type="text" value="0"/>	Gallons	<input type="text" value="0"/>	Gallons
Nitrogen Fertilizer	<input type="text" value="0"/>	Lbs	<input type="text" value="0"/>	Lbs
Natural Gas	<input type="text" value="0"/>	MCF	<input type="text" value="0"/>	MCF
Electricity	<input type="text" value="0"/>	Kw-hr	<input type="text" value="0"/>	Kw-hr

* Enter only those applicable

Click on the Unit text to change from English to Metric or Metric to English units.

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Write File

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An ASCII Text file is available by clicking on the link provided on this page. This Text File will only be **available for a limited time**. Please print and/or save to your local computer.

GIBSON County, Indiana Century's Dynamic Carbon Database COMET-VR File Output for Agriculture:

Your information has been saved to a file.

- Please **RIGHT click** on the link to **SAVE** this report to your computer. Then select "Save Target As" from the list and enter a file name in the appropriate box.
- Please **LEFT click** on the link to **READ** or **Print** this report using your browser.
- File your report using the **"Send Email"** button.

Saved File Link: [ASCII Report](#) 

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Selection

Session Information:

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Location Information:

- **State:** Indiana
- **County:** GIBSON
- **Fips:** 18051
- **MLRA:** 115A
- **LRR:** M

Parcel Information:

- **Report Date:** 2/1/2007
- **Name:** North Forty
- **Size:** 40 Acres
- **Type:** Agriculture

Soil Information:

- **Texture:** silty clay loam
- **Hydric:** N



United States Department of Agriculture

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- 2006 CSP - EAM-40 (COMET-VR)
- 18 states
- \$450,000
- 900 contract-years

Additional Enhancements

- Inclusion of an agroforestry component (Session 10, 10:35)
- Improved feedback and user response
- Improved uncertainty estimation
- Continue soil carbon reporting in CSP
- Tool evaluations/questionnaires

For more information:

- <http://www.airquality.nrcs.usda.gov>
- <http://www.cometvr.colostate.edu>