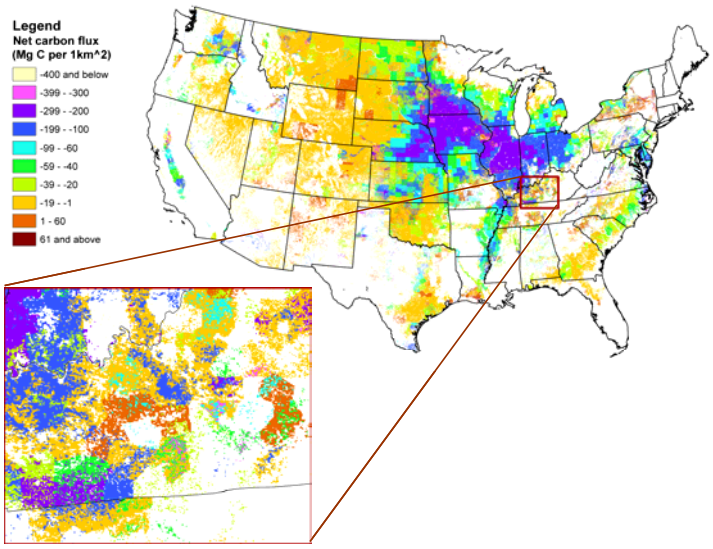
OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY
FACT SHEET

Agronomic Feedstock Production and Environmental Impact Analyses

ORNL uses high-resolution projections of feedstock production in analyses of soil carbon change, soil erosion, energy use, net greenhouse gas emissions, and water quality/nutrient loading.

ORNL research evaluating the changes in soil carbon, soil erosion, energy use, net greenhouse gas emissions, and nutrient loading are simulated using a network of several models and extensive data sets. Field research funded by DOE and the State of Tennessee is contributing data on feedstock yields and nutrient dynamics that are used to further develop our modeling capabilities. Computational resources enable modeling, predictions, and visualization of environmental impacts at the national scale and with highly detailed resolution. Core capabilities are listed below.



Net Carbon Flux from US Croplands at 1km^2 Resolution. This estimate includes all on-site sources and sinks of carbon

Established capabilities

- Soil carbon change is estimated nationally using a full carbon accounting framework developed under DOE Office of Science and NASA.
- All energy and greenhouse gas emissions associated with the production of traditional agronomic crops and dedicated feedstocks are modeled nationally using extensive data sets.
- Soil erosion, based on the Revised Universal Soil Loss Equation, is modeled to estimate the sustainable removal of crop residues for bioenergy.
- Nutrient and sediment export is modeled using the Soil Water Assessment Tool (SWAT). Future projections of water quality are simulated based on estimated adoption of feedstocks.
- Extensive field work is being conducted on nutrient dynamics under dedicated feedstocks to understand carbon cycling and climate change impacts associated with feedstock adoption. This work is being conducted by the consortium for Carbon Sequestration in Terrestrial Ecosystems (CSiTE) funded by DOE Office of Science. Information from this project contributes to the development of models used in sustainability analyses.

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