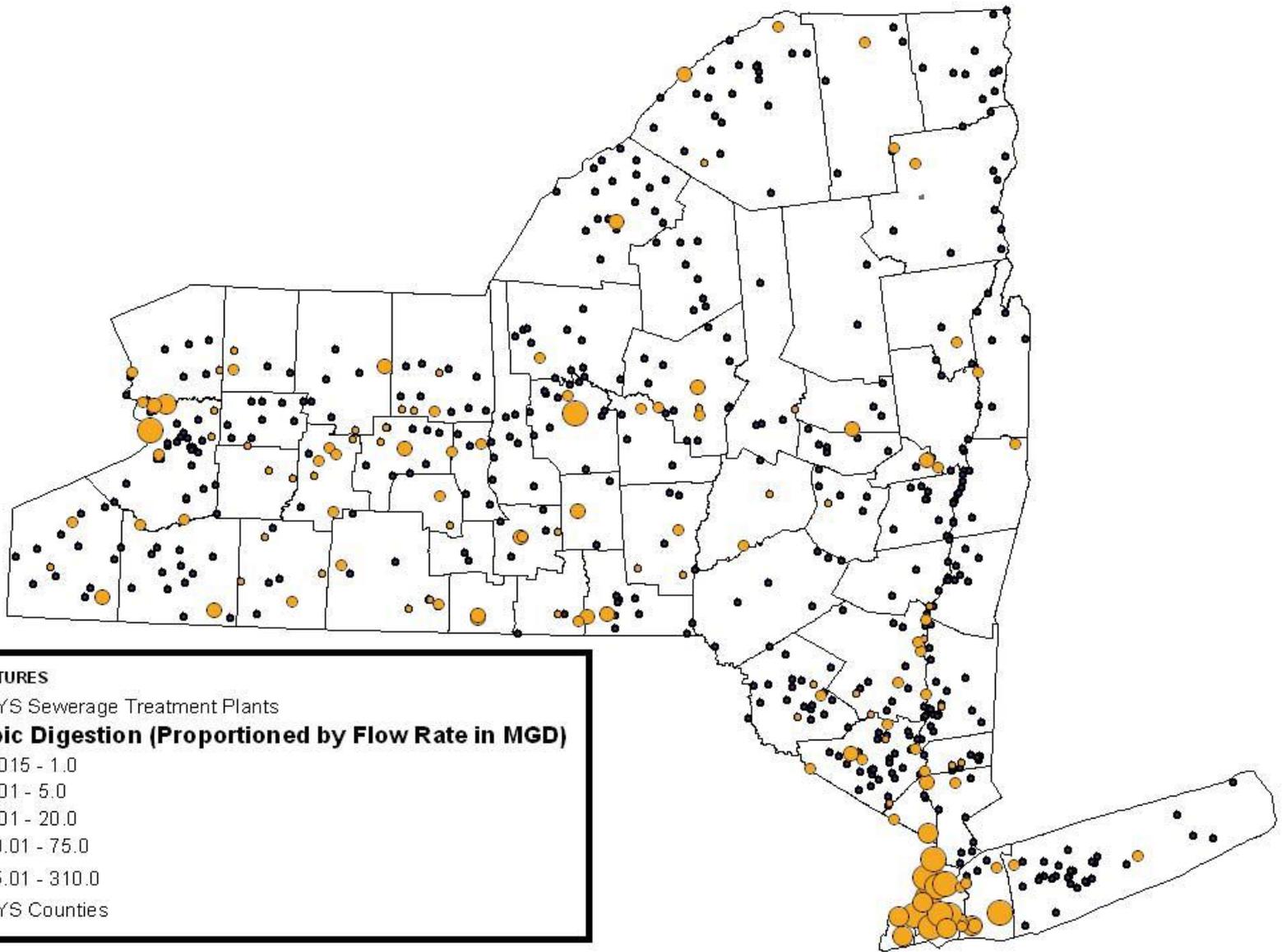


Biogas Digester Potential

October 15, 2009

Potential Sources of Organic Feedstocks for Digestion in NYS

- **Wastewater Treatment Plants**
- **Food Processing Plants**
- **Dairy Farms**
- **Other sources**



KEY TO FEATURES

• NYS Sewerage Treatment Plants

Anaerobic Digestion (Proportioned by Flow Rate in MGD)

• 0.015 - 1.0

• 1.01 - 5.0

• 5.01 - 20.0

• 20.01 - 75.0

• 75.01 - 310.0

□ NYS Counties

Gloversville-Johnstown Digester





G-J WWTP Receiving Food Waste

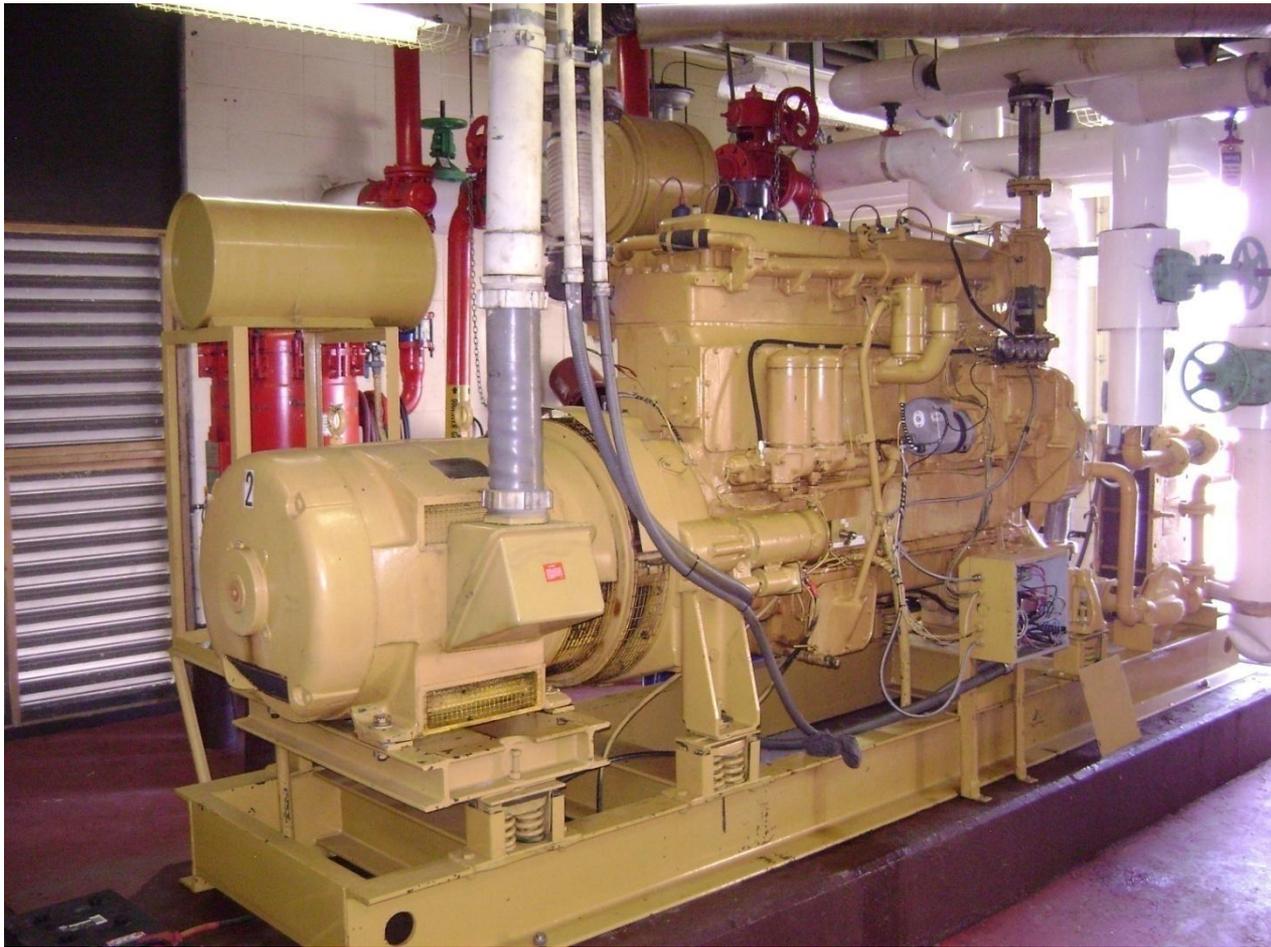


G-J Storage Task for Food Waste

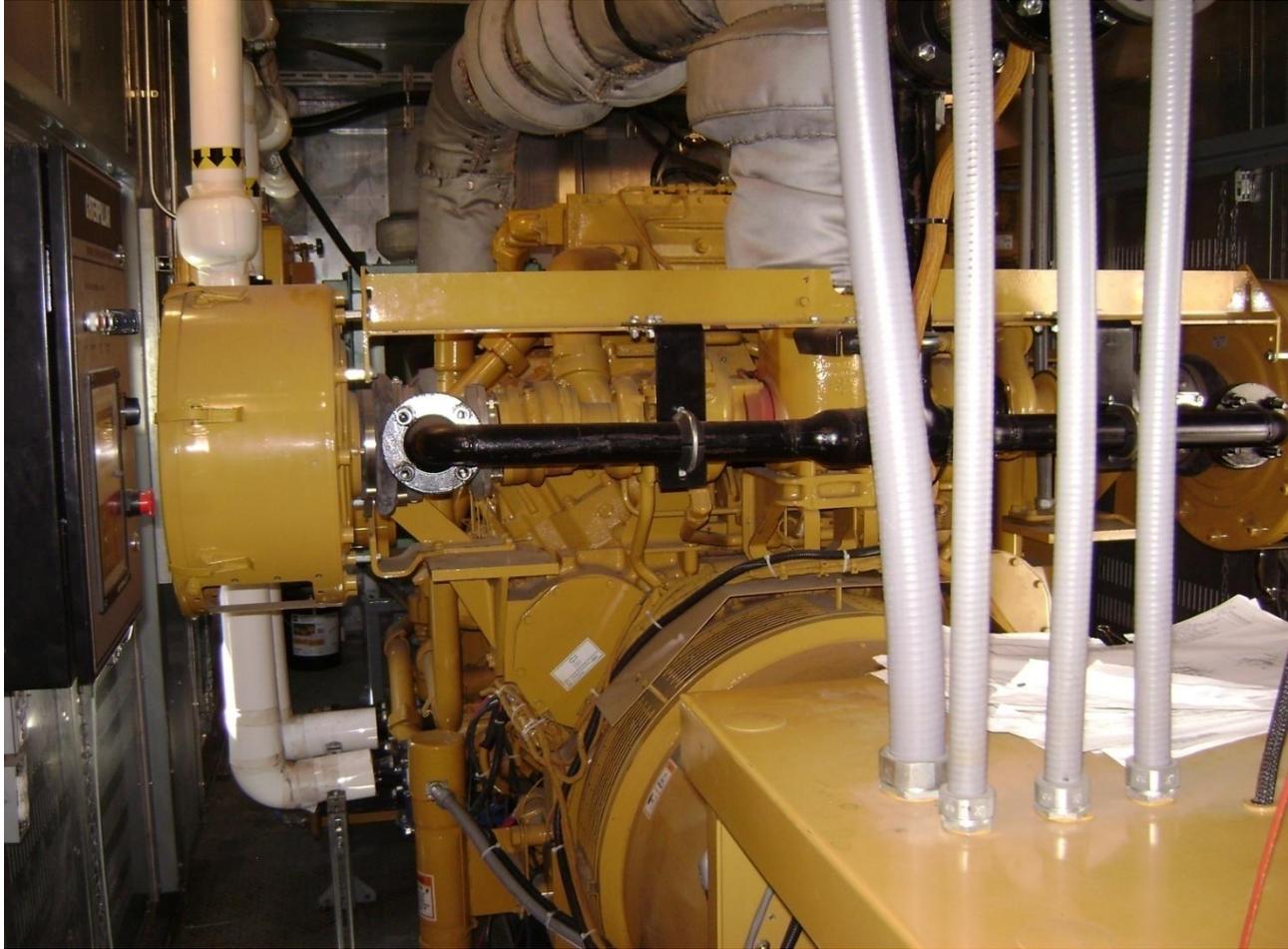




Gloversville-Johnstown Engine-Generator







WWTP Resource Potential

- 590 municipal WWTPs in NYS
- 145 of these with anaerobic digesters
- These 145 have 75% of treatment capacity
 - Biogas potential of 5.2 billion cubic feet/yr
 - Power production potential of 209,000 MWh/yr
- All 590 have
 - Biogas potential of 6.7 billion cubic feet/yr
 - Power production potential of 268,000 MWh/yr

http://wastetoenergy.bee.cornell.edu/

TURNING WASTE INTO ENERGY
A Web-based Spatial Decision Support System of Utilizing Organic Wastes for Renewable Energy Generation in New York State

- Home
- Overview
- Decision Support
- User's Guide
- Background Info
- Research Team
- Acknowledgement
- Contact Us
- News and Updates
- Disclaimer

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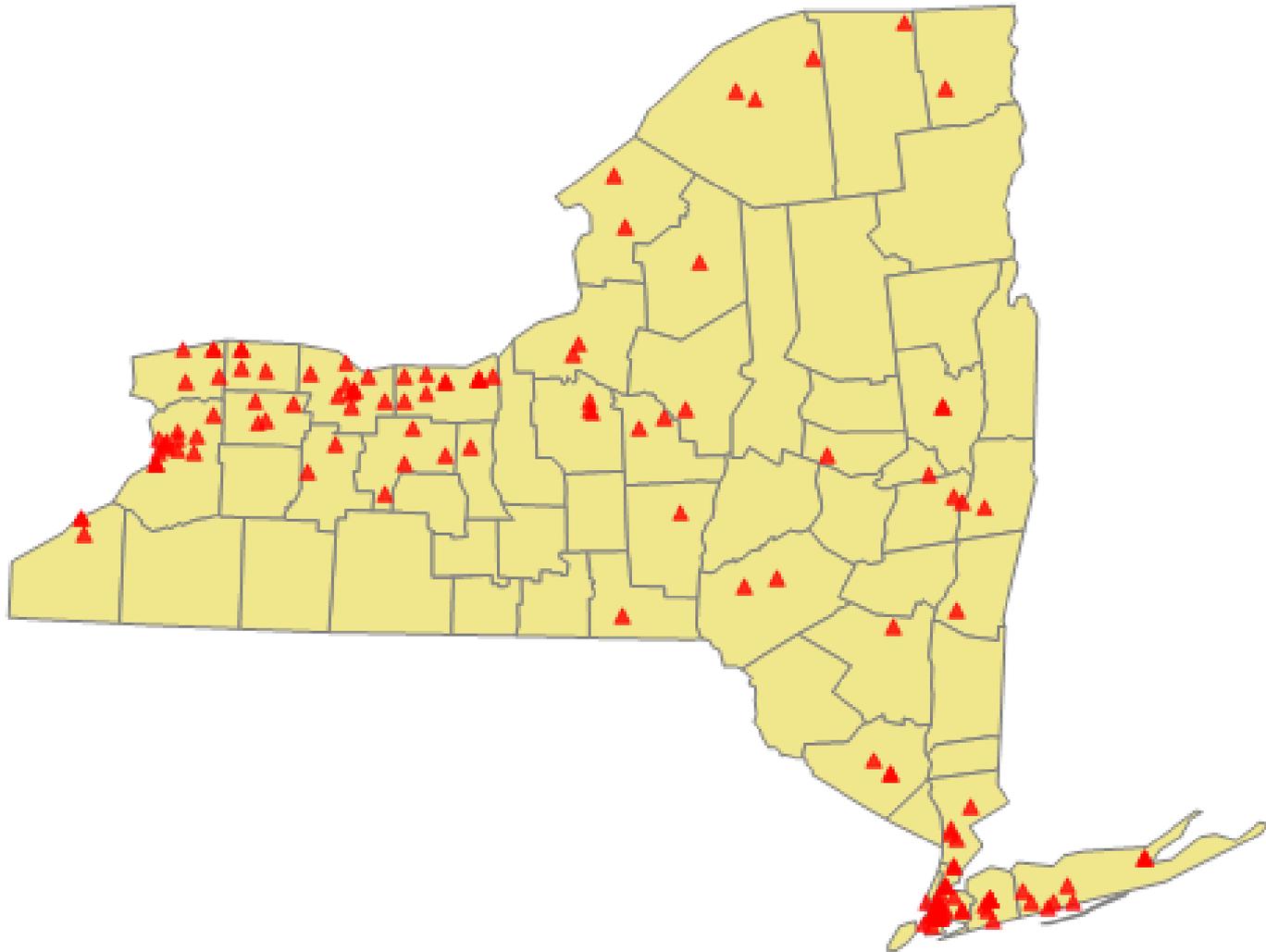
Home >>

Waste is a terrible thing to waste. This is particularly true for organic waste (e.g. dairy manure and food waste) because of its massive volume and significant impact on the environment. However, using appropriate technology, organic waste may become part of the solution instead of the problem. Recently there has been growing interest in using anaerobic digestion (AD) technology to convert such waste into useful energy while harvesting environmental and economic benefits at same time.

This web-based platform is designed to help identify and locate those major generating sources of organic waste for evaluating, planning and designing waste-to-energy projects in New York State. Additional decision-support tools are also provided to help estimate waste production, simulate cost-benefit analysis of potential project, and search technical resources.

Click the image below to enter the spatial decision support system.

Food Processors



Lowville Kraft Digester



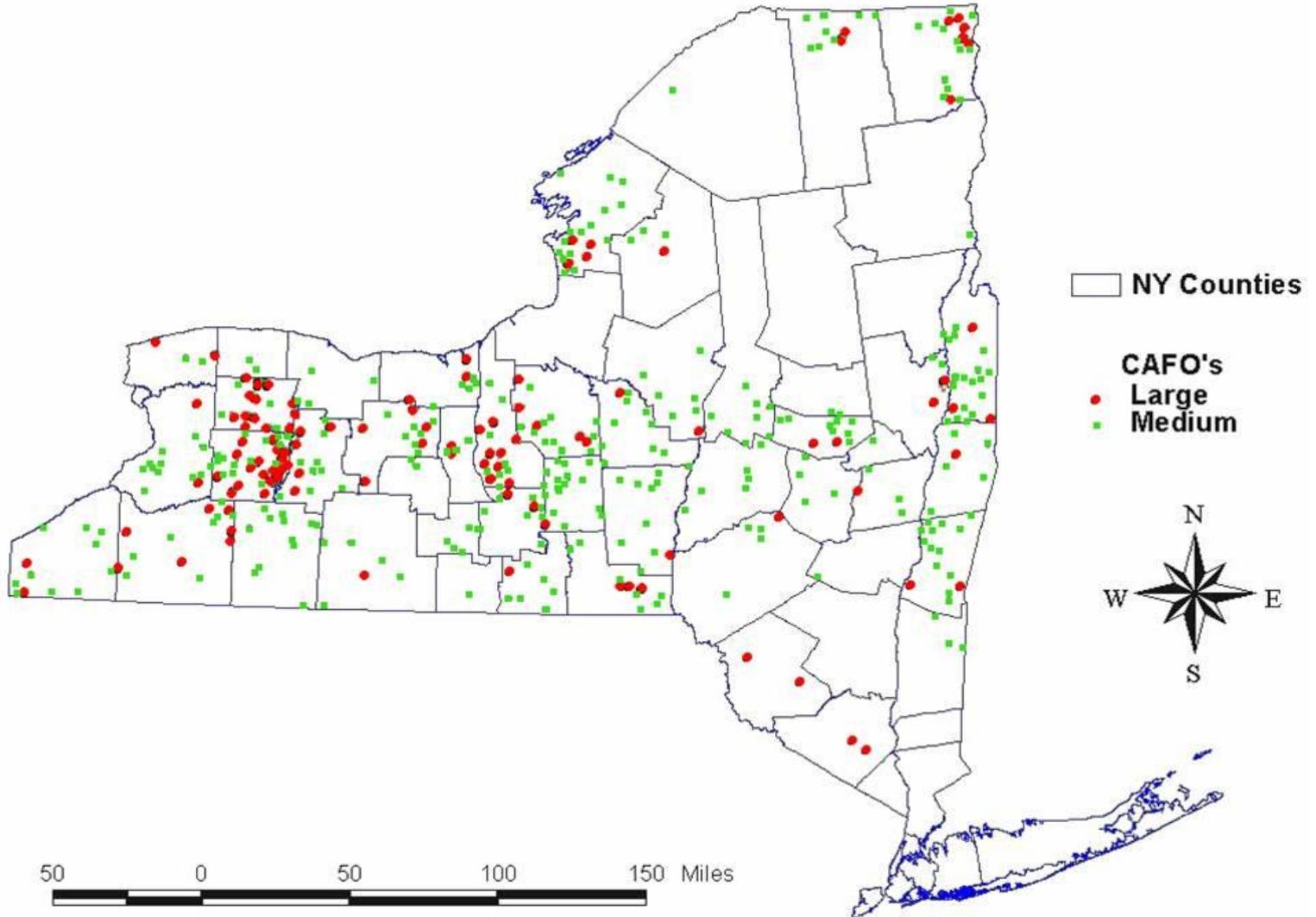
Food and Beverage Resource Potential

- 128 manufacturers evaluated
- Projected potential
 - Biogas potential of 3.8 billion cubic feet/yr
 - Power production potential of 154,000 MWh/yr
- 4 of these with anaerobic digesters
- 23 of 75 responders deliver waste to WWTP
 - Biogas potential of 0.6 billion cubic feet/yr

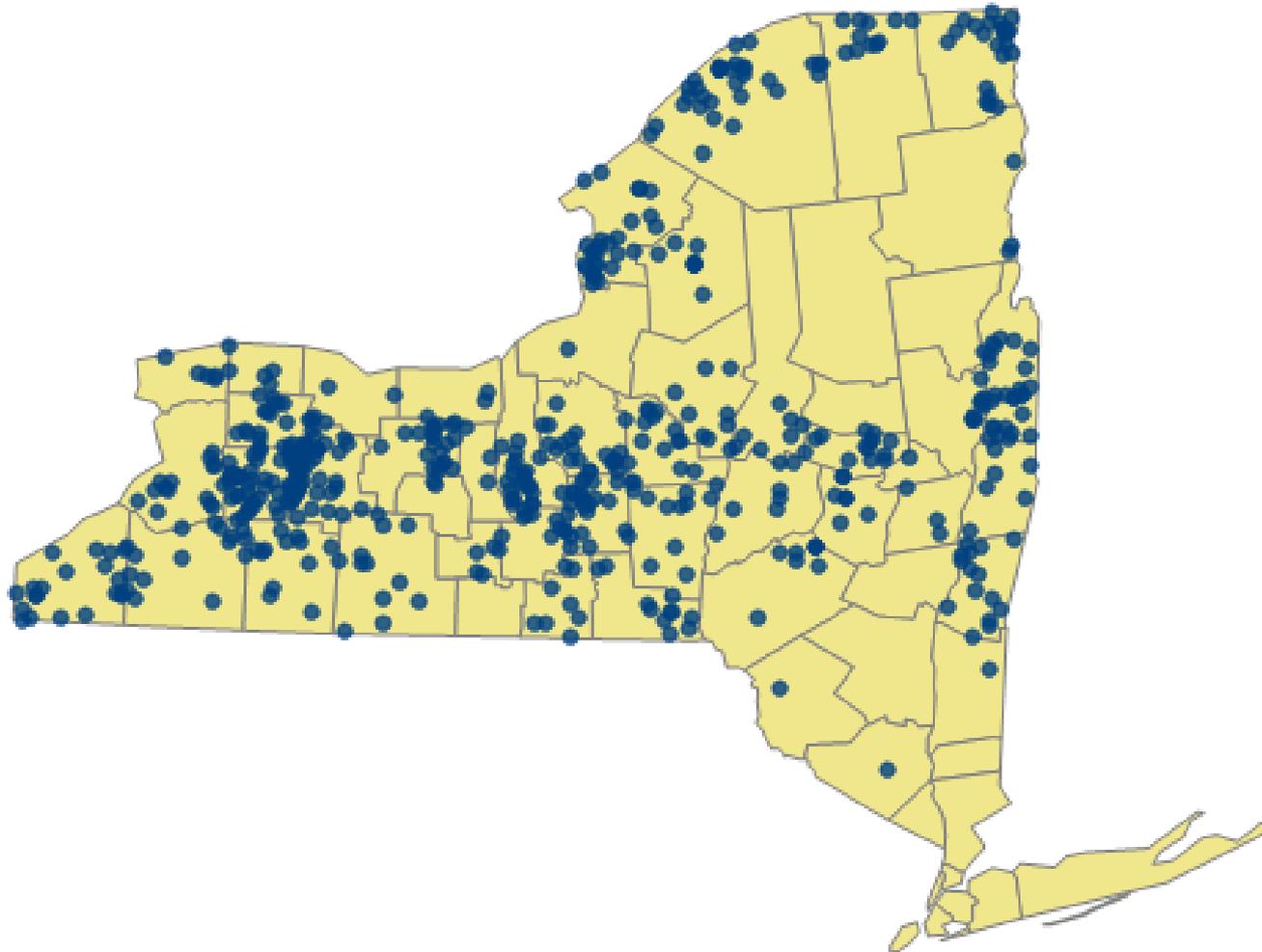
Dairy Farm Resource Potential

- NY is the third largest milk producing state
- About 6,000 dairy farms and 600,000 milk cows
- 600 farms with herds of 200 or more have about 400,000 milk cows
 - Biogas potential of 11.7 billion cubic feet/yr
 - Power production potential of 535,000 MWh/yr

New York State Permitted CAFOs



CAFO Map from Cornell Cow Power Website



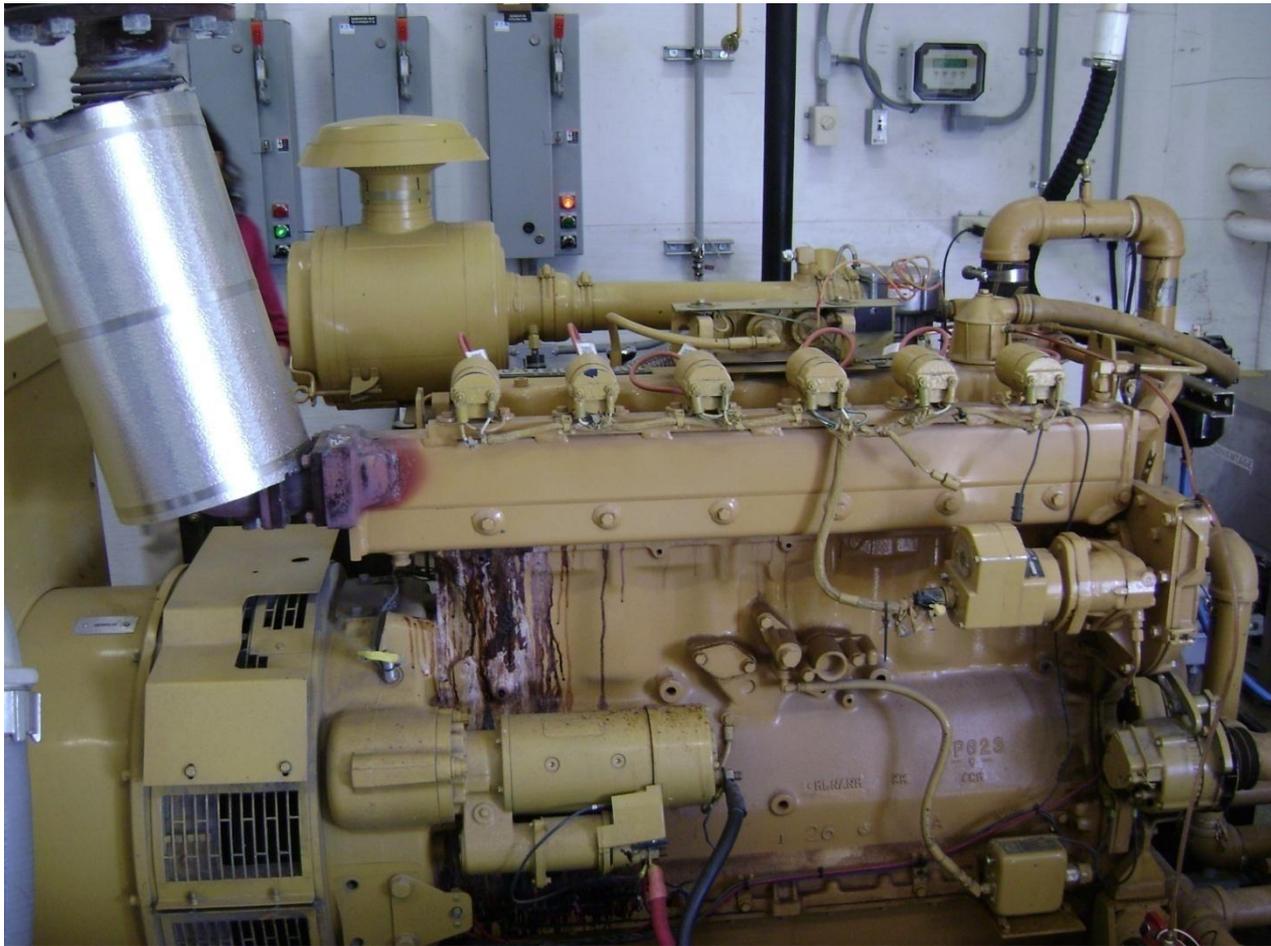
Plug Flow Digester



Mixed Tank Digester



100 kW Engine-generator Set



Mixed Tank Digester in Clymer



Unloading Food Processing Organics



140 kW Engine-Generator Set



Concrete top digester under construction



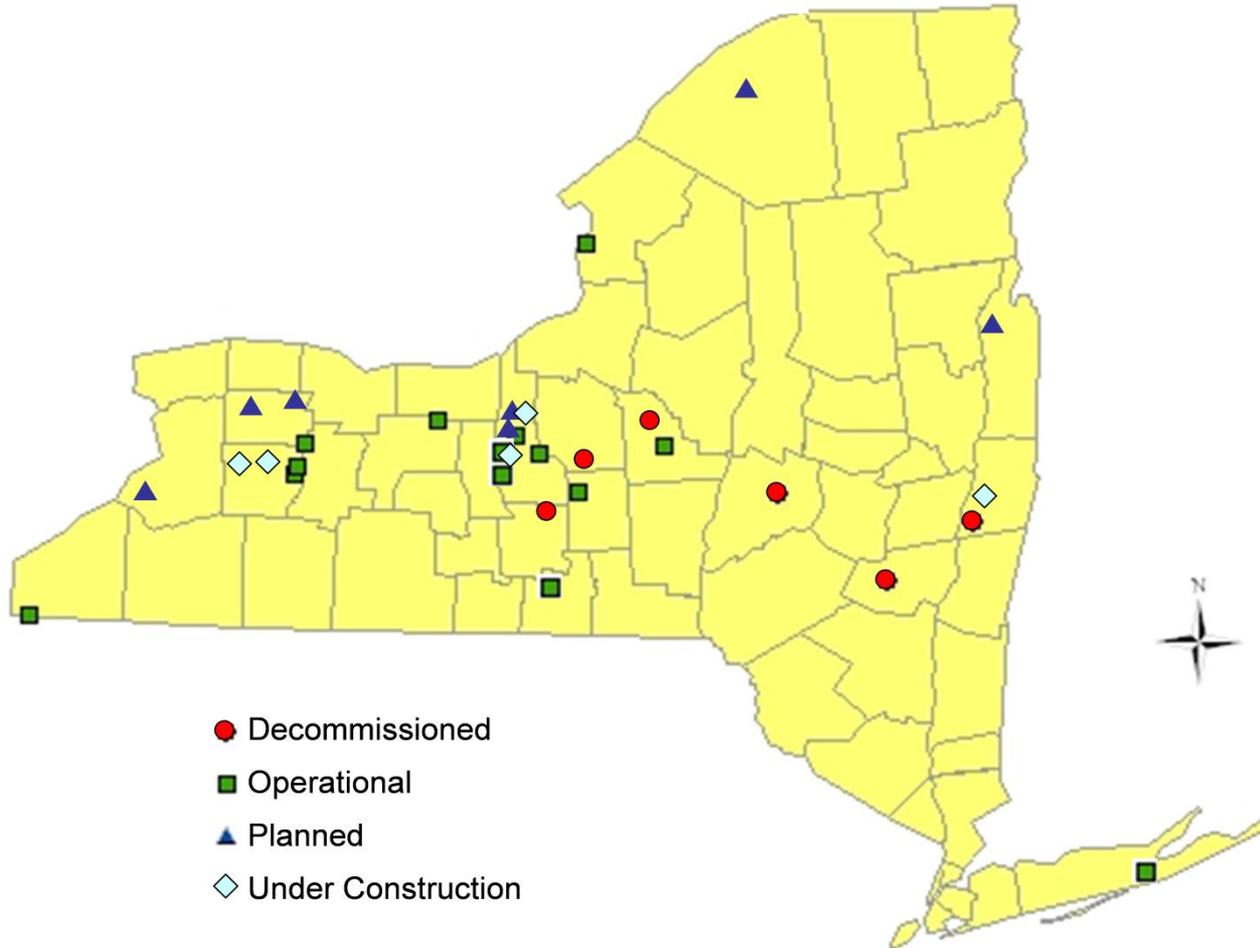
Insulated concrete top digester



Engine Generator Under Construction



Farm Digesters in NYS - 9/1/09



Dairy Farm Projects Developing

- 13 dairy farm digesters operating now have about 14,000 milk cows
 - Biogas potential of 0.4 billion cubic feet/yr
 - Power production potential of 18,000 MWh/yr
- 20 dairy farm digesters planned, under construction or in startup with 25,000 cows
 - Biogas potential of 0.7 billion cubic feet/yr
 - Power production potential of 32,000 MWh/yr

Barriers

- High cost – limited competition and expertise
- Limited monetization of public benefits
- Lead time required for funding, interconnect, and engine delivery
- Limited farm equity
- Grid interconnection issues
 - Ability to accept larger generation
 - Who pays for what changes are needed to grid

Renewable Portfolio Standard Projects and Possible Projections

Contracts and Applications

- WWTP (5)
 - 11,000 MWh/yr
- Food and Beverage Processors (2)
 - 6,000 MWh/yr
- Dairy Farms (24)
 - 61,000 MWh/yr

Near Term Added Potential

- WWTP (~26)
 - 36,000 MWh/yr
- Food and Beverage Processors (~6)
 - 8,000 MWh/yr
- Dairy Farms (~108)
 - 127,000 MWh/yr

Summary of Potential

Resource Potential

- WWTP
 - 268,000 MWh/yr
- Food and Beverage Processors
 - 154,000 MWh/yr
- Dairy Farms
 - 535,000 MWh/yr

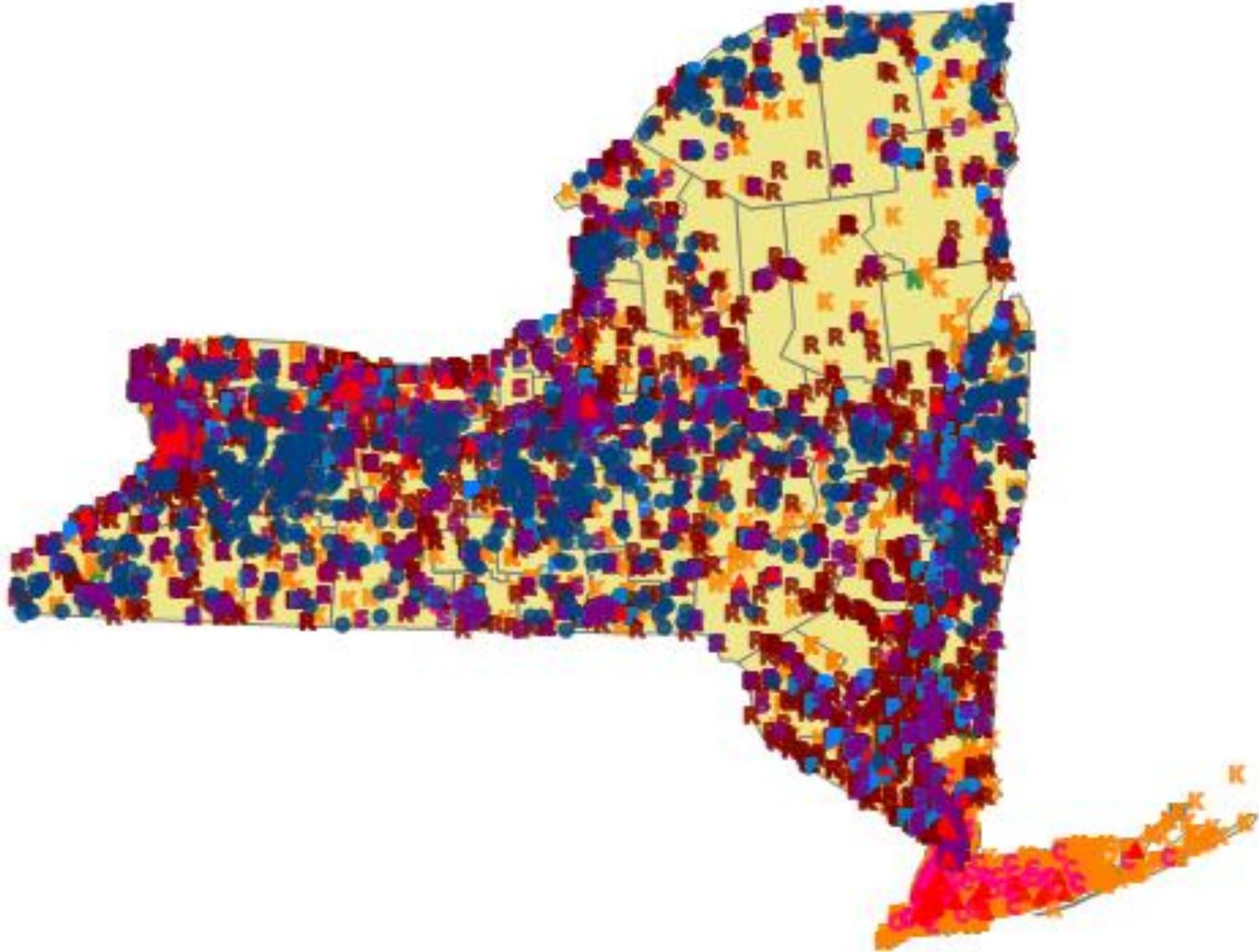
Contracts, Applications and Near Term Added Potential

- WWTP (~31)
 - 47,000 MWh/yr
- Food and Beverage Processors (~8)
 - 14,000 MWh/yr
- Dairy Farms (~132)
 - 188,000 MWh/yr

Other Organic Sources?

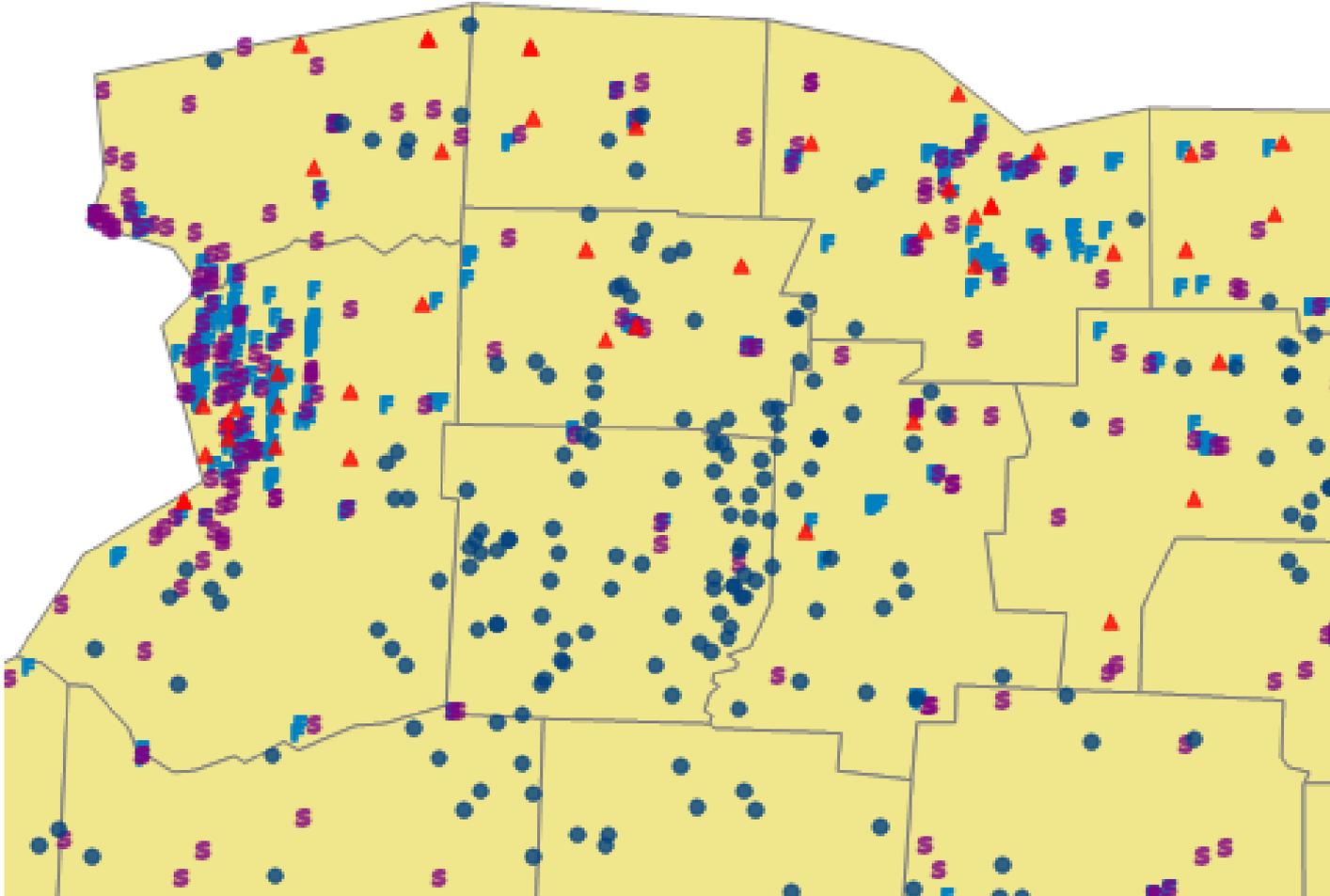


CAFOs and Other Sources of Organics?



Western CAFOs and Other Sources

Food Processors, Supermarkets, Fast Food Franchises



Thank You

Questions and comments
(but no truckloads)

to:

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518-862-1090x3218