



northeastern
BIOCHAR SOLUTIONS



SARATOGA
biochar solutions

**Saratoga Biochar Solutions, LLC
Carbon Fertilizer™ Manufacturing Facility
Moreau, New York**

April 2022

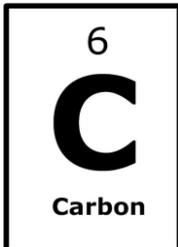
Direct Benefits of:

The Original

CARBON FERTILIZER™

Granular Slow-Release Bio-Fertilizer that builds Soil Carbon

"MADE IN USA from recycled American organic mater, carbon and nutrients."



- **Northeastern Biochar Solutions, LLC (“NBS”) provides the most sustainable use of biosolids to the benefit of human health and the environment.**
 - Transforms dirty industries into green industries.
 - Provides a substitute for biosolids waste disposal.
 - Provides a substitute for chemical fertilizers.
 - Manufactures bio-fertilizers responsibly.
 - Recovers resources to the greatest extent possible.
 - Eliminates PFAS and other contaminants.
 - Reduces greenhouse gas (“GHG”) emissions.
 - Reduces harmful, regulated air emissions.
 - Sequesters carbon in soil where it is needed.
 - Reduces fertilizer consumption.
 - Reduces nutrient pollution in waterways.
- **NBS intends to build Carbon Fertilizer™ manufacturing facilities in constrained biosolids markets throughout the U.S. and provide the technology to utilities globally.**





- **Carbon plays a fundamental role in natural cycles where it is naturally produced.**
 - Forest fires generate carbon while creating oxygen starved environments.
 - Oxygen starved environments ensure the forest is not completely combusted.
 - Leftover carbon adsorbs nutrients (ash) as rainfall begins repairing damaged soils.
 - Forests quickly rebound as seeds sprout and plants take root in fertile soil.

- **Carbon Fertilizer™ is a revolutionary biofertilizer designed to sequester carbon and rejuvenate soils.**
 - MADE IN USA from recycled American organic matter, carbon and nutrients!
 - Produced from biosolids and wood waste.
 - Safely recycles organic matter, carbon and nutrients.
 - PFAS-Free
 - Sequesters its weight in GHG emissions when applied to soil.
 - Slowly releases nutrients “as needed.”
 - Virtually impossible to over-fertilize.
 - Increases soil carbon.
 - Increases soil moisture and nutrient retention.
 - Decreases nutrient runoff/losses.
 - Organic certification will be pursued as biosolids contaminants are fully remediated in the process.

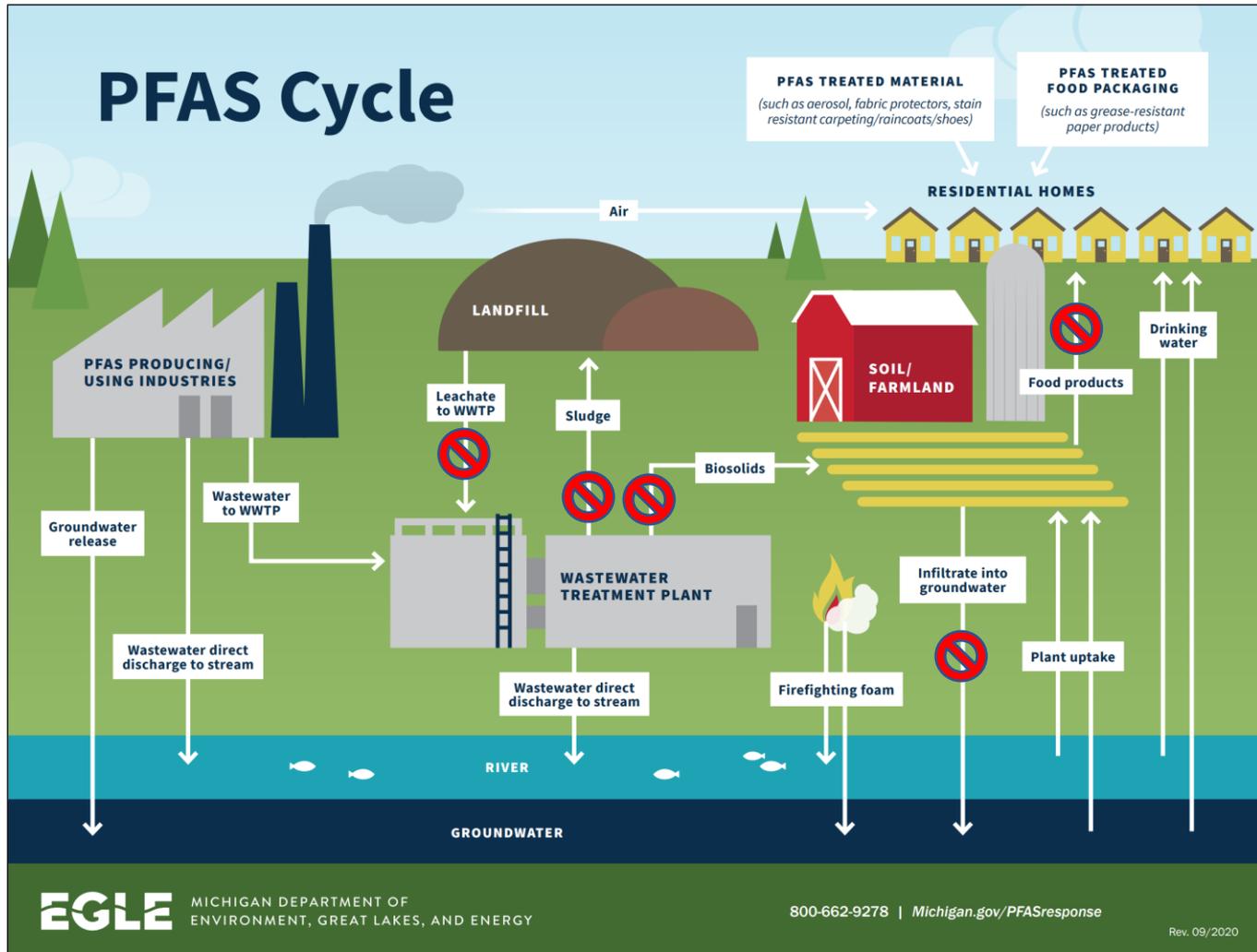


- **Carbon Fertilizer™ is made from biosolids and wood wastes.**
 - Biosolids are produced by publicly-owned treatment works which are regulated by the EPA and the NYSDEC in New York.
 - Biosolids are rich in organic matter, carbon and nutrients, but they also contain traces of PFAS, hormones, pharmaceuticals, oils, fats, greases, heavy metals and other contaminants.
 - Biosolids are regionally sourced and delivered in compliance with NYS DOT.
 - Wood waste is sourced locally from municipalities, counties, and local businesses.
- **Carbon Fertilizer™ is produced using a low-emission/pollution manufacturing process.**
 - Feedstocks are blended, dried and sized to specific requirements.
 - Sized and dried feedstock is heated without oxygen in a pyrolysis process to capture even the toughest contaminants (PFAS) from the solids.
 - The syngas produced in the process is burned in stages to reduce NOx emissions and remediate PFAS and other contaminants in the syngas.
 - The process generates heat which is then utilized in the drying process to reduce natural gas consumption by 83% over other processes.
 - Dryer and thermal oxidizer exhaust is further treated in an advanced air treatment system.

- **SBS provides the most environmentally-friendly biosolids disposal solution.**
 - Destroys PFAS, VOCs, microplastics, pathogens, and other contaminants in biosolids.
 - Avoids spreading PFAS and other contaminants by diverting biosolids from current methods.
 - Achieves lowest emissions of any biosolids disposal method that remediates PFAS.
 - Reduces GHG emissions from biosolids disposal and chemical fertilizer manufacturing.
 - Sequesters carbon in soil where it is needed.

- **SBS avoids spreading PFAS and contaminants by diverting biosolids from:**
 - **Landfills** – Spread pathogens, PFAS, other contaminants, and creates nuisance odors.
 - **Incinerators** – Generate high regulated air and GHG emissions from burning biosolids.
 - **Land Application** – Spreads PFAS and other contaminants directly into food supply.
 - **Composting** – Spreads PFAS and other contaminants directly into food supply.
 - **Drying** - Spreads PFAS and other contaminants directly into food supply

- ❌ PFAS and other contaminants from wastewater effluent streams are eliminated/materially reduced by diverting biosolids to the SBS Facility.



- SBS Pyrolysis provides highest “resource recovery” and lowest emissions.**
 - Maximizing “resource recovery” generates more Carbon Fertilizer™, less GHG emissions, and less regulated air pollutants.
 - Carbon Fertilizer™ is composed of “avoided emissions” that are recycled into the soil, where they are needed, instead of being emitted atmospherically.
 - Using some natural gas in the process reduces the amount of carbon burned for energy and allows us to recover much more organic matter, carbon, and nutrients.
 - Reducing GHG and air emissions enables the SBS Facility to safely service multiple publicly-owned treatment facilities from a single Carbon Fertilizer™ manufacturing facility.

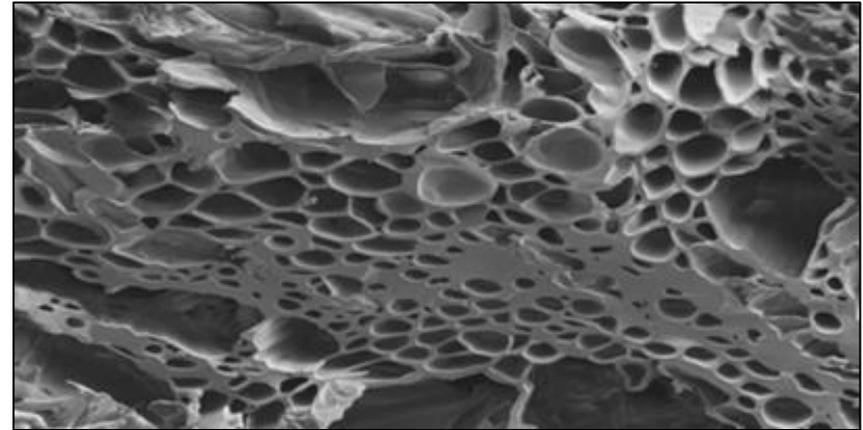
Biosolids Disposal Options	Performance Metrics												
	Solids Recovered in Process	Beneficial Use of Recovered Solids	Potential for PFAS emissions	Ability to Manage PFAS emissions	Potential for NOx emissions	Ability to Manage NOx emissions	Potential for SO ₂	Ability to Manage SO ₂ emissions	Potential for Odor emissions	Ability to Manage Odor emissions	GHG Emissions	Energy Use	
Drying Biosolids	HIGH	YES	YES	HIGH	LOW	HIGH	NO	NA	HIGH	HIGH	MID	HIGH	
Incineration	LOW	NO	YES	LOW	HIGH	LOW	HIGH	HIGH	HIGH	HIGH	HIGH	MID	
Gasification	MID	YES	YES	MID	MID	MID	MID	HIGH	HIGH	HIGH	MID	LOW	
SBS Pyrolysis	HIGH	YES	YES	HIGH	LOW	HIGH	LOW	HIGH	HIGH	HIGH	LOW	LOW	

- **Carbon Fertilizer™ is a mixture of organic matter, carbon, and nutrients designed to promote and enhance plant growth and soil health.**
 - Multi-use bio-fertilizer can be used as a stand-alone bio-fertilizer or custom mixed with other dry fertilizers to target specific nutrient levels.
 - Uses organic matter and carbon to bind nutrients instead of salts (used in chemical fertilizers) that are corrosive to soil organic matter and soil carbon.
 - Organic matter and carbon benefit the soil by increasing its ability to retain water and nutrients, and host microbes that are essential for soil health.
 - Sequesters carbon in soil where it is needed; effectively offsetting its weight in greenhouse gas (GHG) emissions and improving soil hydration.
 - Helps reduce chemical fertilizer consumption as it reduces nutrient runoff (i.e., losses) and slowly releases nutrients as required by crops/plants.
 - Meets Environmental Protection Agency's (EPA) Excellent Quality Class A Fertilizer Product standards (EQ Class A).

- **Carbon Fertilizer™ is a form of biochar embedded with organic matter and nutrients.**

- **Like biochar:**

- Highly porous structure that facilitates absorption.
- Sequesters carbon in soil.
- Adsorbs and slowly releases moisture and nutrients.
- Produced with low-emission process.



- **Unlike biochar:**

- No inoculation required.
- Ready to use as is.
- Contains organic matter.
- Contains nutrients.
- Particle size fits commercial and residential fertilizer spreaders.

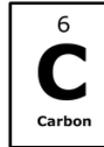


- **Carbon Fertilizer™ provides an economical path for soil/environmental restoration.**
 - Farmers are conscientious about soil carbon, yet they continually apply chemical fertilizers that are bound by salt which corrodes soil over time.
 - Eight decades of chemical fertilizer application has eroded soil carbon nationally yet the demand for chemical fertilizers continues to grow along with the devastation that nutrient pollution causes in waterways nationally.
 - Dead-zones are caused by excess nutrient pollution that feeds algae blossoms which are detrimental to human, animal, and fish health, and related industries.
 - Dead-zones are overtaking lakes, streams, rivers, bays and, most notoriously, the Gulf of Mexico where the dead-zone is currently the size of New Jersey.
 - Carbon Fertilizer™ application helps reverse the trend by increasing soil carbon thereby improving water retention and reducing nutrient losses/runoff downstream.
 - Carbon Fertilizer™ has the lowest cost point of any fertilizer as it is a byproduct of our service.

Dead Zone surrounding Mississippi River Delta in Gulf of Mexico



- **Carbon Fertilizer™ has numerous applications as a fertilizer and soil amendment.**
 - Crop farming – mixes with dry fertilizer products as a substitute for chemical fertilizers.
 - Vegetable/Fruit farming – replenishes soils for sustained production.
 - Greenhouses – excellent grow medium/fertilizer product.
 - Sod Farming – benefits production, distribution (shelf life) and application.
 - Composting – doubles composting speed and increases quality.
 - Golf courses – reduces fertilizer use, nutrient runoff, and risk of over-fertilizing.
 - Road and Railways – adsorbs chemical runoff while fertilizing remediation plants.
 - Contaminated soils – reduces contaminant runoff while fertilizing remediation plants.
 - Seed Coating - 99% emergence, 99% seeding vigor, and yields healthy plants in bioassays.



The Original

CARBON FERTILIZER™



Granular Slow-Release Bio-Fertilizer that builds Soil Carbon

CARBON FERTILIZER™

- **MADE IN USA** from recycled American organic matter, carbon, and nutrients.
- **Made from biosolids and wood wastes.** Biosolids are produced by publicly-owned treatment works. Pathogens, odors, and organic compounds are completely removed from the feedstock and utilized as renewable energy in the process.
- **Multi-use bio-fertilizer** that can be used as a stand-alone bio-fertilizer or custom mixed with other dry fertilizers to target specific nutrient levels.
- **Mixture of organic matter, carbon, and macro and micro-nutrients** designed to promote and enhance plant growth and soil health. Organic matter and carbon benefit the soil by increasing its ability to retain water and nutrients and host microbes that are essential for soil health.
- **Uses organic matter and carbon to bind nutrients (instead of corrosive salts)** to proliferate microbial life, prolong nutrient availability, and reduce nutrient and water runoff/losses; reducing application rates/requirements over time.
- **Sequesters carbon in soil where it is needed;** effectively offsetting its weight in greenhouse gas (GHG) emissions.
- **Low emission/pollution manufacturing process** that maximizes resource recovery and replaces biosolids disposal practices and chemical fertilizer production both of which are heavy GHG emitters/polluters.

4.0 – 6.5 – 0.5

Guaranteed Analysis

Total Nitrogen (N)	4.00%
Ammonia, mg/kg	<8
Nitrate, mg/kg	<3
Organic Nitrogen	4.00%
Available Phosphate (P ₂ O ₅)	6.50%
Soluble Potash (K ₂ O)	0.50%
Calcium (Ca)	3.50%
Magnesium (Mg)	0.50%
Copper (Cu)	0.05%
Iron (Fe)	1.90%
Manganese (Mn)	0.05%
Nickel (Ni)	0.0010%
Sodium (Na)	0.20%
Zinc (Zn)	0.05%
From: biosolids, wood, and ammonium sulfate.	

- Do not exceed 2.78lbs/1,000 sq. ft. in any single application.
- To avoid mower pickup: Apply, irrigate, let dry, and then mow.
- Use maximum setting on any granular dry fertilizer spreader.

CONDITIONS FOR SALE: The Manufacturer warrants only that product conforms to label description. Buyer and user agree to accept all liability associated with handling, use and disposal of this product.

Information regarding the contents and levels of metals in this product is available at: www.northeasternbiochar.com

Not for use in organic crop and organic food production in the State of California.

INSTRUCTIONS FOR USE

Established Turfgrass and Landscape:
Use as a bio-fertilizer for lawns and landscape biannually.

New Turfgrass, Planting and Seeding:
Incorporate into top 2-4 inches of soil prior to seeding, sodding or sprigging and landscape planting.

Commercial Agricultural Use:
Custom mix with other nutrients as desired to obtain desired nutrient loading. Apply after cutting prior crop with granular fertilizer spreader/drill.

Greenhouse Use:
Mix with other nutrients and grow media as desired to obtain desired nutrient loading and water retention.

Application Coverage Rates
For one pound of nitrogen, broadcast at a rate of 2.78lbs per 1,000sq feet (1.21kg per 93 sq. meters).

- 1 bag (50lbs) covers 2,000sf
- 21.75 bags (1,088lbs) covers 1 acre
- 40 bags (1ton) covers 1.83 acres

Application Guidelines

- Apply when air temperatures are under 90°F
- Irrigate after application
- Do not apply when temperature plus humidity exceed 175°F

Storage and Use

- Store in a dry location.
- Keep bag closed and out of reach of children when not in use.



Manufactured by Saratoga Biochar Solutions, LLC
2-6 Electric Drive, Glens Falls, NY
Distributed by Northeastern Biochar Solutions, LLC
26F Congress St. #346, Saratoga Springs, NY 12866
www.northeasternbiochar.com
1 (800) 555-5555

Net Weight: 22.6 Kg (50lb)

Bulk Density: 30.4lbs/c.f.

- **We provide an “essential service” that alleviates a growing problem the right way.**
 - Biosolids disposal is a major source of GHG emissions and a material cost to New Yorkers.
 - The biosolids disposal problem in NY is getting worse despite throwing money at it.
 - We provide a “beneficial use” of biosolids that destroys PFAS and other contaminants.
 - We solve a costly problem that county and governments have with biosolids disposal.

- **We provide an “essential substitute” for harmful chemical fertilizers.**
 - Chemical fertilizers erode soil carbon and reduce soil’s ability to retain water and nutrients.
 - Nutrient runoff pollutes waterways and creates “dead zones” that devastate aquatic habitats.
 - Carbon Fertilizer™ restores soil with organic matter and carbon to reduce fertilizer loss/use.
 - Carbon Fertilizer™ is produced domestically which is needed now more than ever.

- **We provide an “essential GHG reduction.”**
 - We replace heavy GHG emitters (i.e., other disposal methods and fertilizer manufacturers).
 - We produce Carbon Fertilizer™ which sequesters its weight in GHG emissions in soil.

▪ **Raymond Apy – Chief Executive Officer**

- Experienced CEO, entrepreneur, strategist, leader, talent and business developer.
- 30+ years of business experience (engineering, sales, and management).
- 15+ years in business management roles (President, CEO, Managing Partner).
- Masters of Science - Environmental Science, Solid & Hazardous waste engineering, GIS, law and policy - Syracuse University/State University of NY.

▪ **Bryce Meeker – President**

- 15+ years experience in renewable energy development and management.
- 5+ years experience in carbon manufacturing.
- Private equity, investment banking, and strategic consulting background.
- Masters of International Business – Tufts University, Fletcher School.

▪ **Lee Wulfekuhle – Chief Operating Officer**

- Recently sold Wulfekuhle Injection & Pumping, Inc. to pursue ECHV.
- 25+ years operating experience with liming and spreading bio-waste in Midwest.
- 20+ years experience contracting with wastewater treatment plants (WWTPs).
- 1-1/133 RD Infantry in Dubuque, IA (10-years).