

Great Plains **Biochar** Initiative



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Biochar 2018

WHAT IS THE GREAT PLAINS BIOCHAR INITIATIVE?

- Public-private partnerships
 - Nebraska Forest Service
 - Kansas Forest Service
 - High Plains Biochar (Laramie, WY)
 - Wilson Biochar Associates
- Goal is to improve biochar* awareness and market development in the Great Plains



* Wood Based Biochar

GREAT PLAINS FORESTRY

- Nebraska and Kansas have spent \$12 million + in hazardous fuels reduction activities since 2012
- State and federal cost-share available to landowners however it is still often cost prohibitive
- NFS & KFS have forest products programs to develop markets for fuels reduction and forest management residues for cost recovery



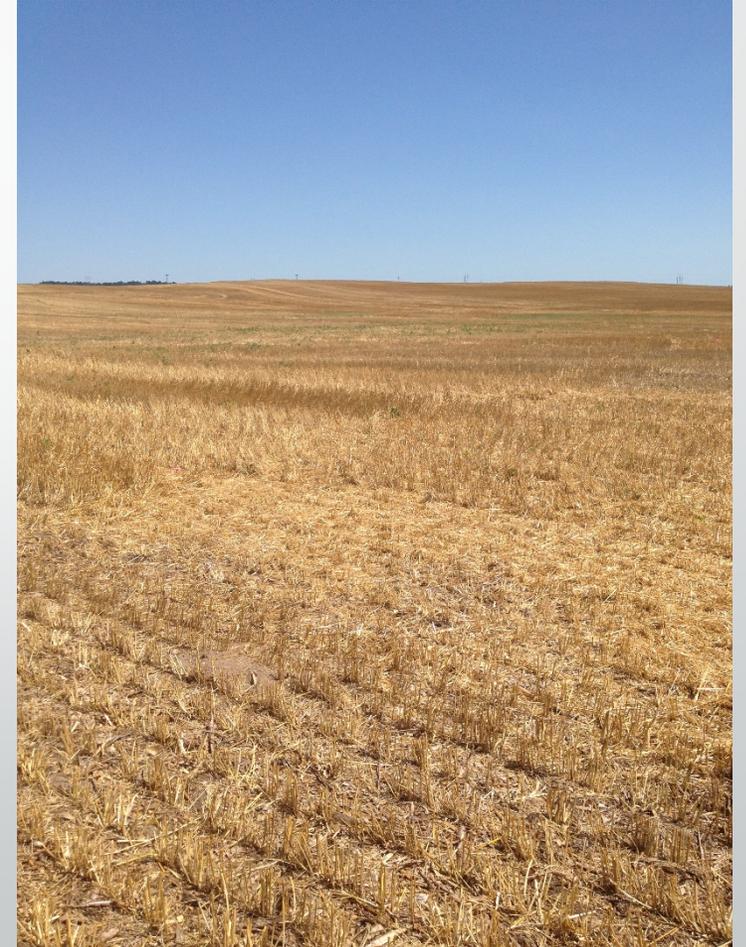
GREAT PLAINS FORESTRY

- Eastern redcedar encroachment in forests and grasslands is a pressing issue for natural resources agencies, landowners
- Emerald ash borer present in both NE and KS
- Windbreak removal and renovation



WHY PURSUE BIOCHAR?

- Minimal existing markets for low quality wood
- Strong agriculture
- Integration into existing concerns & practices
 - Drought
 - Soil carbon conservation (no-till, CRP)
 - Water quantity, quality, & water rights
 - Manure management
- Good relationships with state NRCS, USFS, Cattlemen's Association, UNL, K-State, etc.



THE APPROACH

- Education and outreach
 - Speaking engagements
 - Workshops
 - Publications
- Financial assistance
 - Production
 - Market development
- Strategic planning
- USFS Wood Innovations Grant



EDUCATION AND OUTREACH

- Speaking engagements
 - SAF
 - Departments of Agriculture
 - Radio Stations
 - Sustainable Agriculture Events
- Publications
 - “Small Scale Biochar Production”
 - “Biochar and Green Roofs”
 - Newspaper articles

Nebraska Forest Service, University of Nebraska-Lincoln

SMALL SCALE BIOCHAR PRODUCTION



MAKING BIOCHAR

The process of producing biochar is called pyrolysis. Pyrolysis, by definition, is the “decomposition of material by heat.” It occurs in processes as simple as a campfire and as complex as a state-of-the-art biorefinery.

Biochar production methods are scalable and can be adjusted based on local conditions, feedstock availability, and the intended final use of the biochar.

This publication is an introduction to small scale biochar production methods that can be modified to suit the operator’s preferences.

SELECTING A METHOD

There are many designs to choose from when selecting a biochar production method. How do you know which is right for you? Before choosing a method, you should ask yourself a few questions:

- How much can I spend on equipment?
- How much time can I dedicate to production?
- What will I use for a feedstock?
- Am I going to try to use the waste heat?
- Does the system need to be portable?
- Are there any local zoning restrictions or regulations?

The methods described in this publication can be scaled up or down to reach desired outputs. The images and descriptions are representative of how each system functions.

A large-scale retort kiln produces biochar from locally-sourced biomass

Nebraska is home to a wealth of untapped resources, some that are viewed as problematic. Nebraska has 1.3 million acres of forested land containing over 41 million oven-dry tons of standing woody biomass. This includes hundreds of thousands of acres of eastern redcedar that needs removal to improve forest health. Not included in this statistic are the acres of pastureland upon which eastern redcedar has encroached, nor the hundreds of communities that deal with storm damaged trees, hazardous tree removal, and trees that will come down as a result of emerald ash borer infestation.

The wood waste generated from forest and community management activities is typically burned or landfilled. Creating value added products such as biochar will play a significant role in reducing the environmental impacts of burning and prolong the life of our landfills. Among other solutions, biochar will be part of a holistic response to forest and wood waste management in the state of Nebraska.

Learn more: nfs.unl.edu/great-plains-biochar-initiative

EDUCATION AND OUTREACH

- Workshops
 - Hands-on learning opportunities
 - Wilson Biochar Associates



FINANCIAL ASSISTANCE

- \$80,000 awarded through \$5,000 mini-grants
- Kansas:
 - 10 Submissions
 - 4 Funded
- Nebraska:
 - 13 Submissions
 - 5 Funded



PROJECT HIGHLIGHTS

- Norton Community Garden Coalition
 - Established spring 2018
 - Demonstration of biochar use
 - Long term goal of diverting waste wood from landfills to biochar production



PROJECT HIGHLIGHTS

- Hopfen Prärie
 - Organic hops production
 - Biochar + worm castings
 - 4 treatments
 - Soil testing, yield
 - Developing market for Nebraska hops



STRATEGIC PLANNING

- Based on mini-grant projects
 - Identify market opportunities
 - Identify regional production opportunities
- Next steps for the initiative
 - Funding
 - Technical assistance



OTHER SUCCESSES

- Nebraska just received its first request for the NRCS CSP for biochar
- North Dakota has joined the Great Plains Biochar Initiative
 - Previous work on windbreak renovation biochar
 - Collaborating on educational materials

Biochar

PLANTS ABSORB CO₂ FROM THE ATMOSPHERE

Increases bioavailability of nutrients

Improves plant growth & yield

Sequesters carbon

Avoids smoke or landfilling

What is pyrolysis?

AGRICULTURE & FORESTRY WASTE

PYROLYSIS Making Biochar

ENERGY

BIOCHAR

Improves soil fertility

Provides habitat for soil microbes

Increases soil moisture retention

nfs.unl.edu/forestproducts

UNIVERSITY OF Nebraska

NEBRASKA FOREST SERVICE

Institute of Agriculture and Natural Resources

Application opportunities

Soil Amendment

- Neutralize acidic soils
- Improve soil health
- Alleviate soil compaction

Water Filtration

- Remove urban pollutants
- Capture nutrient runoff

Green Infrastructure Component

- Storm water management
- Urban tree planting

Livestock Operations

- Odor control
- Manure management
- Poultry bedding

Land Reclamation

- Revegetate contaminated soils
- Capture and bind toxins

ACKNOWLEDGEMENTS

- U.S. Forest Service
- Kelpie Wilson, Wilson Biochar Associates
- Dave Bruton, Kansas Forest Service
- Rowdy Yeatts, High Plains Biochar
- Biochar 2018 Planning Committee





Thank you!

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