

FOR IMMEDIATE RELEASE

NDSU-NDFS Announce New Feasibility Study on Converting Shelterbelt Biomass to Biochar

DATE: 2/23/2017

CONTACT:

Derek Lowstuter, Forest Restoration Specialist  
NDSU-NORTH DAKOTA FOREST SERVICE  
916 E Interstate Ave, Suite #4  
Bismarck, ND 58503  
Tel: (701) 328-9990  
Cell: (701) 537-3584  
E-mail: Derek.Lowstuter@ndsu.edu  
www.ndsu.edu/ndfs

The North Dakota Forest Service (NDFS) sponsored a feasibility study by Wilson Biochar Associates to analyze new, low-cost methods of converting dead and diseased trees to biochar. This process conserves soil carbon, improves air quality through smoke reduction, and reduces hazardous fuels for potential wildfires. The report, ***Converting Shelterbelt Biomass to Biochar***, is available online at:  
<https://www.ag.ndsu.edu/ndfs/documents/wba-converting-shelterbelt-to-biochar.pdf>

The mission of the North Dakota Forest Service is to care for, protect and improve forest and natural resources to enhance the quality of life for present and future generations. Increasingly, the windbreak or shelterbelt trees planted throughout the state are in need of renovation. NDFS works with state, federal and private partners to help landowners manage and regenerate windbreak trees and shrubs. The NDFS was awarded funding through the North Dakota Outdoor Heritage Fund to provide financial assistance in renovating degraded windbreaks. In most cases, dead trees are burned in open piles for disposal.

The USDA-NRCS recently added an enhancement for biochar production to their Conservation Stewardship Program (CSP), providing a financial incentive for producing and applying biochar on farms. Biochar is a modern technology that is based on a range of traditional agricultural practices that return carbon to soil in the form of long-lasting charcoal. Charcoal performs many important functions in soil: enhancing water holding capacity, retaining nutrients, improving soil tilth and increasing soil humus content, resulting in increased plant growth and vigor. Biochar is also very useful in animal agriculture. It is rapidly becoming known for its ability to manage manure and prevent nutrient leaching.

Shelterbelt renewal is a good opportunity to realize the benefits of biochar at minimal cost. Dead and diseased trees have to be disposed of anyway, and they can be processed into biochar on site using low-cost technologies and standard forestry equipment. The

resulting biochar is pathogen free and it can be incorporated directly into the soil, along with appropriate fertilizers, to prepare it for new plantings. Biochar is especially helpful in establishing trees. It can help young saplings withstand drought, flooding, disease and other harsh conditions, such as saline or alkaline soils.

Wilson Biochar Associates examined three case studies using three different methods of low cost biochar production, analyzing production methods and costs. All the methods use the principle of flame carbonization. Flame carbonization takes advantage of the fact that wood burns in two stages, a gasification stage that burns with a flame, and a solid fuel combustion stage that reduces charcoal to ash. Using either an open burn method or a container, the burning process is interrupted before the solid fuel combustion stage, saving the char to be used as biochar for soil improvement. The flame carbonization methods analyzed include specially constructed open burn piles called Conservation Burns and several types of containers called Flame Cap Kilns.

The case studies are based on actual job sheets for shelterbelt renewal projects. Wilson Biochar Associates created a spreadsheet model for estimating biochar production efficiency and costs for each scenario. The cost per cubic yard of biochar produced ranged from \$23 to \$62. The cost per ton of biomass processed ranged from \$21 to \$28.

Incinerating woody biomass for disposal contributes to smoke pollution, greenhouse gas emissions and the waste of resources. These problems can be avoided by using low-cost and clean methods to convert woody waste to valuable biochar. Biochar markets are still immature, but bulk totes of biochar generally sell for between \$200-\$400 a cubic yard.

- END -

Note: pictures below are available at high resolution upon request



*Figure 1. Sonoma Biochar Initiative in Sonoma, California teaches the Conservation Burn method to convert vineyard prunings to biochar. Photo courtesy of Raymond Baltar/Sonoma Biochar Initiative*



*Figure 2. Snow quenching in Nebraska. Rowdy Yeatts of High Plains Biochar uses snow to quench Conservation Burn piles. Photo Courtesy of Rowdy Yeatts/High Plains Biochar, Chadron, NE.*



*Figure 3. Arborist Brandon Baron makes biochar in a modified 10,000-gallon water tank (Photo courtesy of The Tree Service, Burns, Oregon)*