Montana State University • Missouri River Watershed Coalition

Bioenergy Applications

Objective 2: Investigate and demonstrate the use of innovative bioenergy technologies that promote the utilization of Russian olive *(Elaeagnus angustifolia)* and saltcedar *(Tamarix* spp.) biomass as a fuel source.

Purpose

Russian olive and saltcedar are hugely problematic invaders that presently infest more than one million acres within the Missouri River Watershed region and are virtually untapped sources of biomass. This project proposed that the tons of mostly herbicide-treated biomass, much of which had simply been left in piles, could be processed on location or shipped to nearby processing facilities by producers and used as a new bioenergy source.

The primary goal of Objective 2 was to investigate and demonstrate innovative bioenergy technologies that promote the use of Russian olive and saltcedar biomass as new raw materials or "feedstocks" for bioenergy generation.

In early 2010, prior to the start of the project, the Center for Invasive Species Management and Missouri River Watershed Coalition conducted preliminary feasibility tests on samples of herbicide-treated and untreated Russian olive and saltcedar biomass. This action was taken to ensure that the material could be safely used as a bioenergy source, and had a heat value competitive with other vegetative materials currently used as fuel sources.

Methods

Russian olive and saltcedar samples were collected from five sites in Montana and Wyoming in 2010 and 2011. The samples were sent to two independent laboratories, which conducted feasibility tests to determine BTU levels generated per pound of material, ash content, volatile matter content, and moisture content. The test results were then compared to data from forestry species traditionally used in bioenergy applications. Additional samples were tested in 2012 to determine whether elemental composition of the plant material would negatively impact its potential value for use in bioenergy applications. Test results were sent to Tom Miles, an independent consultant, for further assessment.

Results/Discussion

Laboratory feasibility tests demonstrated that Russian olive and saltcedar biomass materials could be safely used as a bioenergy source, and that their BTU (calorific values) and ash content levels were competitive with other woody biomass feedstocks. Results showed that both species fall within the "acceptable" range for bioenergy generation. Miles found that while the elemental composition of Russian olive and saltcedar biomass may be less desirable for production as standalone raw material, they could be blended with other woody species commonly used in bioenergy applications. In addition, the plant materials could be processed in biochar form and used as soil amendments in a variety of restoration practices. Miles' analyses of the costs associated with harvesting and transporting the biomass to a limited number of regional biofuels facilities indicate that, currently, woody biomass cannot compete with low-cost, traditional fossil fuel-based energy sources (coal and gas), which are abundant in the region.