



Missouri River Watershed Coalition

Innovative Conservation Approaches to Invasive Plant Management in the Missouri River Watershed: From Invasive Species Prevention and Control, to Biomass Utilization and Bioenergy Generation

Background

In August 2010, the Missouri River Watershed Coalition (MRWC) and the Center for Invasive Plant Management (CIPM) at Montana State University received a \$1 million Conservation Innovation Grant (CIG) from the USDA Natural Resource Conservation Service (NRCS). The three-year project will provide knowledge and benefits to producers and land managers throughout the Missouri River Watershed and will serve as a pilot project for the western region and potentially the nation.

The longest river in the United States, the Missouri River Basin covers a geographic area of 529,350 square miles and includes six states (Colorado, Montana, Nebraska, North Dakota, South Dakota, and Wyoming). Invasive species are displacing the native plant community structure along riparian areas and have greatly impacted the conservation of native species. This project will investigate and demonstrate the use of innovative technologies and approaches to address the natural resource conservation concern of invasive species management; and leverages federal and state investment in environmental enhancement and protection, in partnership with agricultural producers. An outcome of the project will be transfer of technologies, management systems, and innovative approaches into the private sector and NRCS publications.

Project Objectives

Field activities for the project will be implemented in multiple locations within the Missouri River Watershed. Project objectives are:

- Fostering the adoption of innovative conservation approaches to invasive riparian plant management by monitoring herbicide treatment and control sites infested with Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix* spp.) for short and long-term ecological changes, riparian system health and function, environmental protection, and natural resource enhancement;
- Investigating and demonstrating the use of innovative bioenergy technologies that promote the utilization of invasive plant biomass as a fuel source; and
- Utilizing the CIPM's and MRWC's management and communications infrastructure and network to coordinate the project and transfer project findings, products, and technologies to a broad range of regional stakeholders.

Project Contacts

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Russian olive infestation, Photo: Jeff Combs



Saltcedar, Photo: Steve Dewey, Utah State University, Bugwood.org



Portable pellet mills will be used on-site to convert Russian olive and saltcedar biomass into marketable biofuel pellets.

To learn more about the MRWC, our partners, goals, and projects, visit our website:

www.weedcenter.org/MRWC

MRWC Executive Committee

Andy Canham, *President*, Mid-Dakota Vegetation Mangement | Karie Decker, *Vice President*, CIPM | Liz Galli-Noble, *Financial Officer*, CIPM
Dave Burch, Montana Dept. of Agriculture | Mitch Coffin, Nebraska Dept. of Agriculture | Slade Franklin, Wyoming Dept. of Agriculture
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Project Timeline Oct. 2010 – Sept. 2013

Project Partners

- MRWC and CIPM
- Private landowners and producers
- Private sector/industry
- Local, state, and federal governments

Funding

Federal NRCS CIG Award: \$1 million
State Match (MT and WY): \$1 million

About NRCS – Conservation Innovation Grant (CIG) Program

The purpose of CIG is to stimulate the development and adoption of innovative conservation approaches and technologies, while leveraging the Federal investment in environmental enhancement and protection of riparian areas in conjunction with agricultural production. CIG projects are expected to lead to the transfer of conservation technologies, management systems, and innovative approaches (such as market-based systems) into NRCS policy, technical manuals, guides and references, or to the private sector.

Due to its use and adaptation of proven bioenergy technology, innovative approach to on-the-ground conservation practices, technology transfer component, and watershed-scale approach, the MRWC project satisfies three of the 2010 NRCS–CIG National Award categories: energy; priority landscapes; and program outreach and conservation technology transfer to targeted groups.

Focal Components of the Project

Establish and monitor treatment and control sites for ecological changes

Long-term treatment and non-treatment sites will be established in three or four of the MRWC member states. Sites will be monitored to show long-term response in native and non-native plant communities, and effects of herbicide treatments on riparian system health and function. Over the course of the overall project, data collected will be used to answer critical questions, including:

- Are Individual Plant Treatments (IPTs) effective in treating the target species while minimizing the impact to the surrounding desirable vegetation?
- Are there ways of controlling invasive species that cause less damage to the riparian ecosystem?
- Is it more important to reduce non-native seed dispersal than to kill the parent plant?

Furthermore, we hope to develop best management practices for short-term and cost-effective control of invasive species as well as long-term riparian ecosystem health and function. Conservation technologies, management systems, and innovative approaches obtained from this component of the project will be transferred to private landowners, and local, state, and federal governments.

Investigate the feasibility of using non-native species biomass for beneficial purposes, specifically, bioenergy generation

This project is intended to demonstrate innovative yet practical conservation technologies, which will facilitate the utilization of raw woody biomass generated in the process of controlling invasive species. Russian olive and saltcedar presently infest at least one million acres, mostly in the western US, and are a sustainable and virtually untapped source of biomass. To facilitate the adoption of these conservation approaches, this project involves only technologies that are currently available commercially. This project component seeks to:

- Demonstrate the potential to offset the costs of invasive plant control and removal;
- Restore wildlife habitat and ecosystem function; and
- Reduce the wildfire threat posed by accumulated invasive plant biomass.

Specific activities will include a demonstration of on-site conversion of Russian olive and saltcedar infestations to a usable form (chips), and the testing of both species as alternative feedstocks for pelletization and conversion to bio gas.

Conservation technologies, management systems, and innovative approaches obtained from project activities will be transferred to the private sector (heating, energy, and power generation interests) and others seeking alternative sources of biomass feedstock.



A Russian olive management site near Billings, Montana. The area on the right side of the fence line has been treated (note the stump and piles of biomass), while the area on the left side of the fence has not been treated.



Russian olive biomass.



Pelletized invasive plant biomass.

BTU Testing

The MRWC conducted BTU tests on saltcedar (*Tamarix* spp.) and phragmites (*Phragmites australis*) from April to June 2010 to determine the viability of using these invasive species as a reliable fuel source. Both species were found to be in the “acceptable to good” range – with caloric values of 7,530 and 6,829 BTUs/lb respectively. Ash contents also fell within an “acceptable” range at 2.1 to 2.6 percent for saltcedar and 8.0 percent for phragmites. BTU tests conducted on Russian olive in 2008 in Montana found caloric values greater than 8,300 BTU/lb and ash content of less than 1.94.

Wood Pellet Efficiency

According to a draft report prepared by the Montana State Legislature in September 2010, the US Department of Energy noted that with combustion efficiencies of 78 to 85 percent, wood pellet burning stoves are not only exempt from EPA smoke-emission testing requirements, but are the cleanest solid fuel-burning residential heating appliances.¹

¹ Harvesting Energy: An analysis of methods for increasing the use of forest and agricultural residues for biomass-based energy generation in Montana. 2010. Draft report to the 62nd Montana State Legislature. Helena, Montana: Environmental Quality Council.