



United States Department of Agriculture  
Natural Resources Conservation Service

NE-FRD01-2 2011 Ranking Period 1

## FRD01 – On Farm Research and Demonstration 2 Predictive Modeling of Eastern Red Cedar

### State Criteria for on Farm Research and Demonstration

**Research Topic:** Predictive modeling of eastern red cedar (*Juniperous virginiana* L.) distribution and spread using geospatial information technologies and a decision support system for management decisions

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**Name and brief description of the research entity:** The University of Nebraska-Lincoln West Central Research and Extension Center (WCREC) located near North Platte, NE. The faculty at the WCREC conduct applied agricultural research and Extension education programs in the West Central District.

### General description and summary of research to be conducted:

- Red cedar is easily identifiable in rangeland because of the extreme contrast when compared to the predominantly grass-type plants in the background. Using this contrast, descriptive maps with presence/absence will be developed for the ranch. By combining maps of cedar populations with maps of environmental variables (e.g., soil type, relief, water sources) located on the ground and marked with GPS, distribution maps a predictive model of red cedar encroachment can be assembled. In addition, treatments (e.g., cutting, burning) used to manage red cedar will be added as another layer to the GIS map of cedar and environmental variables.
- The model will be used to determine priority areas for management/control measures of red cedar. By combining environmental variables with the red cedar locations, patterns will begin to emerge from the correlations made over time.
- This three year project would commence in the fall (September) of 2011 with plot establishment, field sampling and aerial photography (i.e., remote sensing). In 2012 and 2013, field sampling and aerial photography would be done in the spring and fall of each year. In spring of 2013, the final field samples and aerial photographs would be collected from the site. In year 2, enough data will be generated for analysis and submission for a preliminary publication. In year 3, a detailed publication will be prepared pertaining to the modeling and DSS functionality for use in managing cedar, a model invasive plant species.

**Geographic Area:** Counties of Arthur, Blaine, Chase, Custer, Dawson, Dundy, Frontier, Furnas, Grant, Gosper, Hayes, Hitchcock, Hooker, Keith, Lincoln, Logan, McPherson, Perkins Red Willow and Thomas in Nebraska.



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**Participant requirements:**

- Researchers will work directly with the producer to develop a detailed project plan that provides project details, plot locations, on aerial photos and in written format and **be provided to NRCS prior to starting the project.**
- Provide access to land and apply red cedar modeling technology for prioritizing control.
- The landowner involved in this study will successfully implement the tools of mapping (distribution and predictive) and a decision support tool to focus control methods on the most at-risk locations. The landowner will provide an example for other land managers to follow that have cedar on rangelands or pastures in the Mountain Prairie region.

**Number and size of on-farm research sites needed:** Minimum of three and maximum of six rangeland tracts 500-1550 acres in size with varying levels of Eastern red cedar encroachment where some control measures will be implemented.



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**Documentation: Complete the following Table and provide the documentation listed below:**

Tract	Field(s)	Acres Planned	Specific Topic Area	Acres Applied (completed by operator)
<i>EX. 1</i>	<i>1</i>	<i>1100</i>	<i>Red Cedar Modeling and Control</i>	<i>1100 acres</i>

**I certify that the following information meets specifications and has been provided to NRCS:**

1. Complete the table above and provide a map with delineation of the area where the enhancement was applied including partial fields.
2. Yearly reports will be provided to inform NRCS and associated stakeholders of the project progression and a final report at the end of the third year based on University of Nebraska Extension Service that documents that details findings of the research project..

**Certified by:** \_\_\_\_\_ **Date:** \_\_\_\_\_