

**Russian Olive (*Elaeagnus angustifolia* L.)
Distribution Mapping for the Upper Yellowstone River and Tributaries Using Feature
Analysis Software, an Extension for ArcMap**

By

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Introduction

Russian olive (*Elaeagnus angustifolia* L.) was introduced to the United States in the early 1900's. The tree has been planted in Montana for shelterbelts, windbreaks, wildlife habitat and ornamentals. Russian olives have naturalized and are expanding its range along the Yellowstone River; its tributaries, as well as other watersheds in the state. They can be found along riparian corridors, irrigation delivery systems, pastures, saline affected areas, and some wetland sites. The Natural Resources Conservation Service (NRCS) used remote sensing to examine the extent of Russian olive expansion. The GIS dataset identifies the location of Russian olive populations within the Upper Yellowstone Watershed; Gallatin, Park, Sweet Grass, Stillwater, Carbon, Yellowstone, and Big Horn Counties.

Method

The unique color, size and growth form of the Russian olive allows for the use of remote sensing techniques to extract Russian olive features from the NAIP imagery. Feature Analyst, an extension for ArcMap, was used to locate and draw polygon features around the tree canopies. This was followed up by a manual editing process to help remove obvious errors. The resulting shapefile provides an accurate representation of Russian olive distribution along the Yellowstone River corridor and its major tributaries.

Like all remote sensing projects, there are trade-offs between accuracy and efficiency, as well as limitations of the imagery. Errors of omission, particularly under canopy, are probably more likely than false positives. The probability of false positives may increase in eastern Montana where silverberry (*Eleagnus commutata*) and silver buffaloberry (*Shepherdia agentea*) are more common. Smaller trees were typically missed by the software, and were inserted during the editing process. Given the stated limitations, it is recommended that the data be field checked for site specific applications. That being said, this dataset should be a very useful tool for analyzing Russian olive location, distribution, and concentration.

Data Results

There are approximately 3,000 canopy acres and over 300,000 polygons for the Upper Yellowstone Watershed. While many polygons represent individual trees, they also represent groups of trees, or even dense groves over 25 acres in size.

The dataset can be found at f:\geodata\land_use_land_cover\Russian_Olive\. It can be brought right into ArcMap or used through Toolkit as a resource layer.

Russian Olive Map/GIS Data Applications

1. Location, distribution, and concentration of Russian olive trees within the watersheds and/or landscape;
2. Area of canopy cover in square feet or acres;
3. Establishing priority areas and target funding opportunities;
4. Number of landowners with Russian olive trees on their property;
5. Develop conservation plan maps;
6. Information for contracting purposes;
7. Outreach and education with landowners, conservation districts, weed districts, county extension offices, and others.

Reference Material

Katz, G. L. and Shafroth. 2004. Biology, Ecology and Management of *Elaeagnus angustifolia* L. (Russian olive) in Western North America. *Wetlands* 23(4): 763-777.

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