

# NEBRASKA TECHNICAL NOTE

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Range and Pasture Technical Note No. 17 – **REVISED**  
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Range and Pasture Technical Note 17 covers the Nebraska Field Inventory Procedures for Determining Brush Canopy Cover and Density using Photographic Guides. Quantifying the woody plant component of a landscape can help in understanding important changes in the trend of a plant community. Measurement of these changes can be quantified through two methods: canopy cover and plant density.

Subjects covered in this Technical Note include the following:

- Canopy cover (page 2)
- Density (page 3)
- Protocols for Field Measurements for Woody Canopy Cover and Plant Density (page 3)
- Aerial Photographic Guide for Estimating Canopy Cover for Eastern Redcedar and Ponderosa Pine (page 4)
- Photographic Guide for Estimating the Density of Eastern Redcedar (page 5)

## NEBRASKA FIELD INVENTORY PROCEDURES for DETERMINING BRUSH CANOPY COVER AND DENSITY USING PHOTOGRAPHIC GUIDES

Quantifying the woody plant component of a landscape can help in understanding important changes in the trend of a plant community. Measurement of these changes can be quantified through two methods: canopy cover and plant density.

The Brush Management Conservation Practice Standard (314) requires that pre-treatment cover or density of the target plants be determined, as well as the planned post-treatment cover or density. A brush management monitoring plan also requires identifying measured changes in the plant community to be treated.



Photographic guides of various woody plants in terms of canopy cover and density can be used to help visually quantify the plant community into three broad measurements of canopy cover or density. Each photograph is supported by a ground-based measurement.

**Canopy Cover** Canopy is defined as the percent of the ground shaded by a plant species with the sun in a vertical position over it. Remote sensing imagery in the form of digital aerial photography can be used to estimate canopy coverage on large, mature woody species, such as trees greater than 6 feet in height or brushy thickets. On landscapes with a diversity of plants at different coverage classes, stratification of the landscape may be helpful. Stratification can assist in determining which treatment method will be the most feasible. Methods for stratifying a landscape for monitoring or treatment are described in *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems*, Herrick et al., Volume II, 2005. Treatment methods for brush control are described in [Brush Management Design Procedures \(314DP\)](#).

Current aerial photography no older than three years, taken near mid-summer, or when leaf canopies are fully developed on deciduous plant species, should be used to estimate canopy cover with this method.

- Obtain current aerial photographs of the proposed treatment area that are no more than 3 years old.
- Compare the current aerial photography of the treatment area to the photographic guide at the same scale, 1:4000.
- Use the aerial photographic guide to stratify the project area into the three broad canopy categories, 5-20%, 21-50%, and 51-70%.
- Determine the acreage of the stratified plant communities by canopy category.
- Record the canopy information on [Brush Management Job Sheet, NE-CPA-19](#).

## **Density**

Density measurements indicate the number of individual plants per unit of area. This method can provide information about the presence of single stemmed woody plant seedlings or saplings that are too small to be easily detected from aerial photography. Density measurements also help in early monitoring of encroachment by invasive woody plants. Observations of the size class of woody plants can be used in conjunction with density measurements to help determine the best treatment method for the area.

The photographic guide illustrates woody plants at ground level in three broad density categories: 25-150 plants/acre, 151- 370 plants/acre, 371-500 plants/per acre. On-site field observation to determine the density and size class of plants is required for this method.

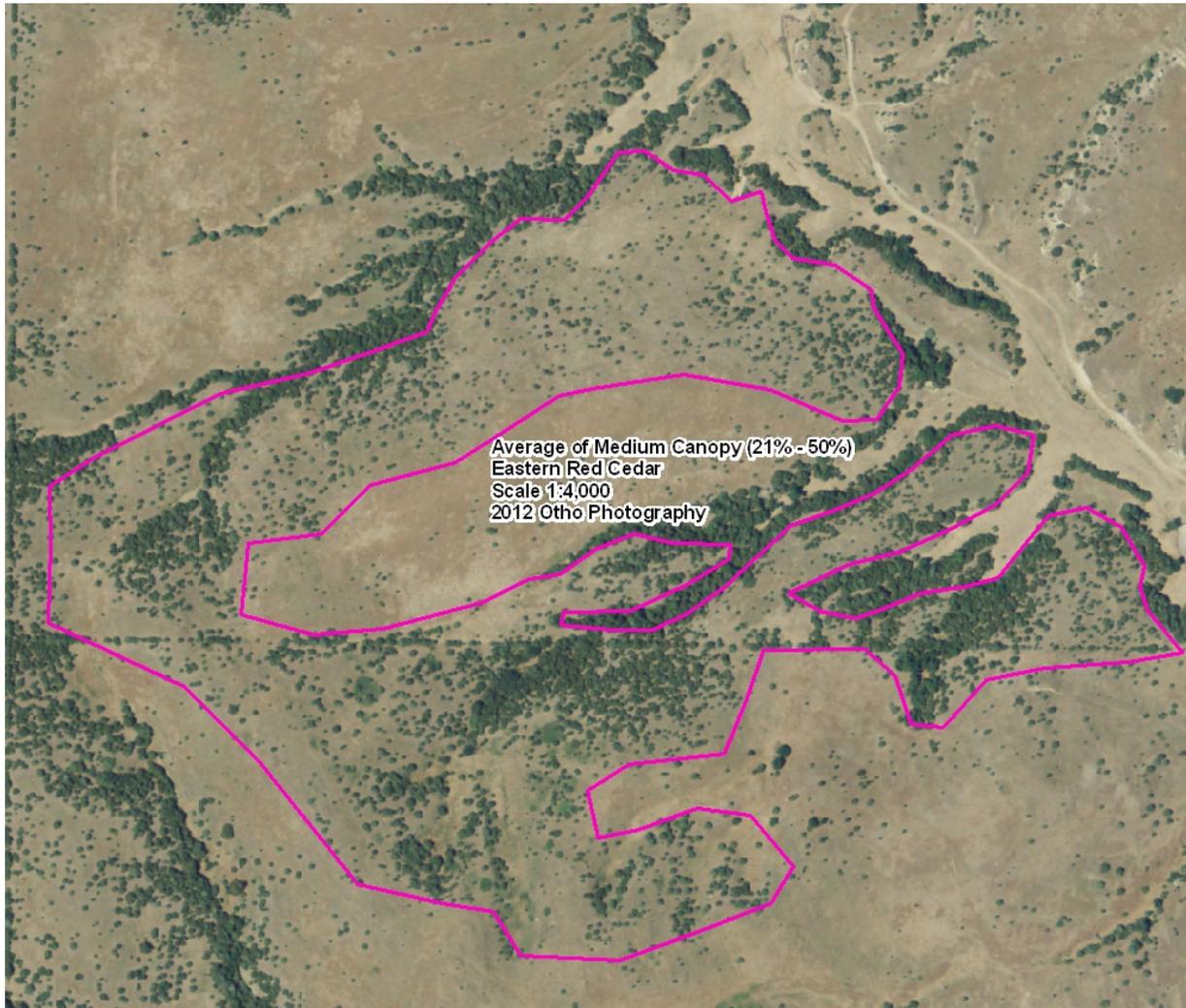
- Obtain a current map of the area to be measured. Aerial photographs, topographic maps, or diagrams can be used.
- Using the photographic guides, stratify the area to be measured into the three broad density categories: 25-150 plants/acre; 151- 370 plants/acre; 371-500 plants/acre.
- Record the density of the targeted plants on Brush Management Job Sheet, NE- CPA-19.

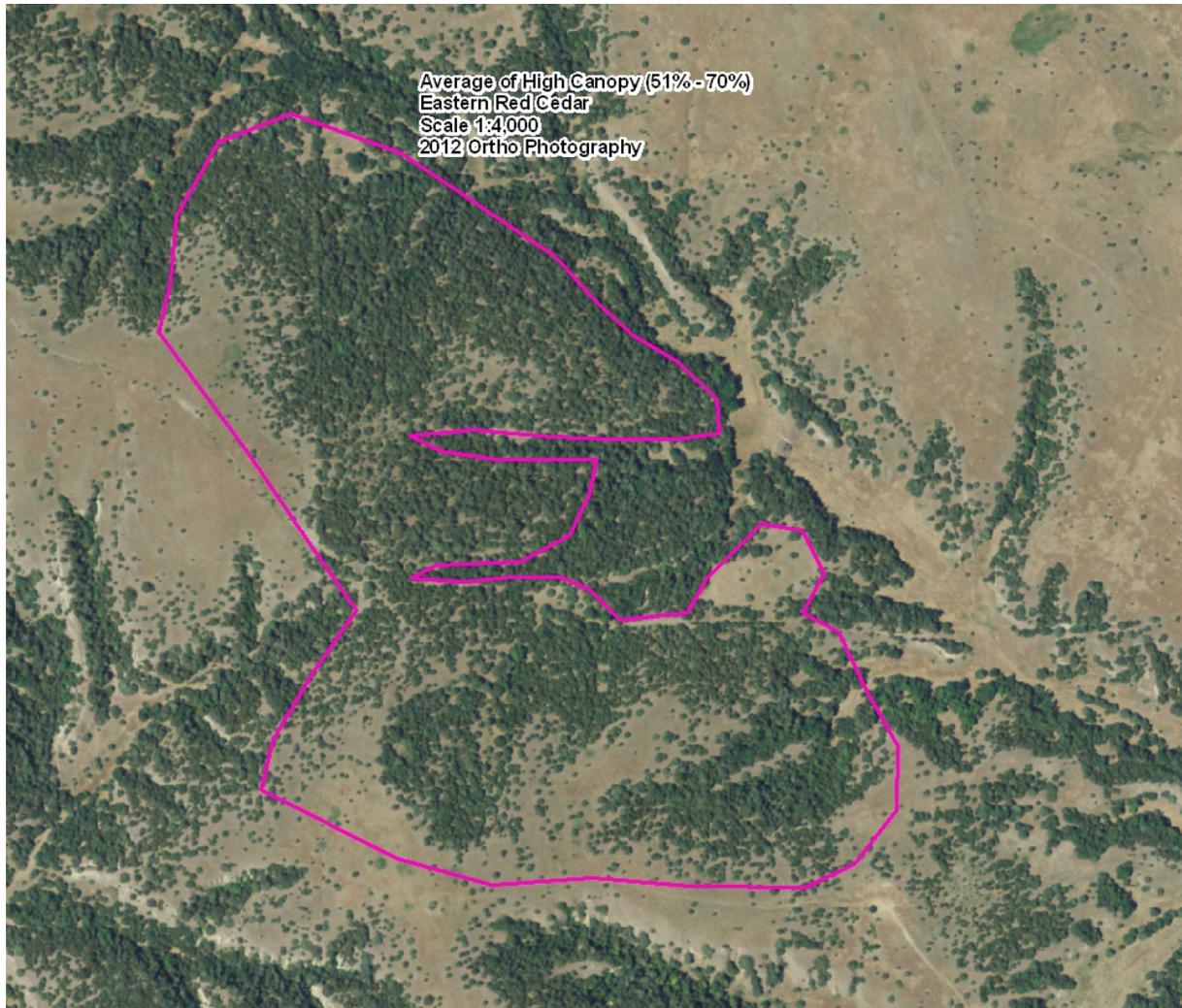
## **Protocols for Field Measurements of Woody Canopy Cover and Plant Density**

When site specific measurements of woody plant canopy cover and plant density are needed, refer to the protocols listed in “*Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems*”, Volume I Quick Start, Herrick, et al., 2005, pages 9 and 30. Density measurements can be recorded on [NE-ECS-15 Belt Transect Worksheet for Determining Tree Density](#). Plant canopy measurements can be recorded on [NE-ECS-3Step-Point Cover Method Worksheet](#).

**AERIAL PHOTOGRAPHIC GUIDE FOR ESTIMATING CANOPY COVER FOR  
EASTERN REDCEDAR AND PONDEROSA PINE**







**PHOTOGRAPHIC GUIDE FOR ESTIMATING THE DENSITY OF EASTERN REDCEDAR**



**50 trees/acre**



**200 trees/acre**



**500 trees/acre**