

NEBRASKA TECHNICAL NOTE

U.S. Department of Agriculture
Natural Resources Conservation Service

June 6, 2013

Range and Pasture Technical Note #21 - **REVISED**

Doug Whisenhunt
State Burn Specialist

DETERMINING CANOPY – BASED ON THE AVERAGE TREE CANOPY DIAMETER AND TREES PER ACRE



BACKGROUND:

Determining canopy cover for the purpose of planning, scheduling, and applying Conservation Practice 314, Brush Management, is the baseline requirement in providing alternatives to clients.

Brush infestation must average at least a low canopy level, (as defined by current PPS), by target specie or a combination of target species to meet the minimum treatment threshold. Refer to 314DP for canopy cover levels and more specific guidance on when brush management should be recommended. For example, Osage orange, three percent; honey locust, three percent; and Eastern red cedar, four percent, for a total of 10 percent canopy of all undesirable species. Even though the individual specie canopy percentages are under the low canopy level for each species, the combination of the three species (existing in the same plant community) exceeds the low canopy level; therefore meeting the minimum resource concern threshold.

Use the following steps to estimate canopy cover when using this method:

- 1) Identify acres needing treatment on a map, according to the infestation tree canopy levels as identified in the 314DP, Brush Management Design Procedure. Define areas needing treatment on the conservation plan map, along with the tree canopy cover determination on a Brush Management job sheet
- 2) Determine average tree canopy diameter (edge of drip line to edge of drip line) of target brush specie(s) by estimating the average tree canopy diameter being treated. For stands with multiple sizes or diameters of woody species present, it will be necessary to evaluate or count numbers of woody plants or trees with different canopy cover areas. For example, 10 trees with an average diameter of 10 feet, five trees with an average diameter of 14 feet, and 20 trees with an average diameter of four feet. (Remember acres being treated must have an average canopy cover that meets the level of infestation identified on the Brush Management job sheet).
- 3) Determine the average number of trees per acre by one of the following methods:
 - a. Complete at least three transects that are at least 100 feet long and at least twice as wide as the average tree canopy diameter but not less than 10 feet wide that represent the average for the site. Count the number of trees within each transect. Determine the area within transects for example: 16 ft wide X 100 ft long = 1600 square feet. Determine the average number of trees in transects on a per acre basis.
 - b. Select an area that represents the average number of trees/acre and count the number of trees and average canopy diameter within the area. Outline the sample area on an aerial photo in order and determine acreage. Determine the average number of trees within the area on a per acre basis.
- 4) Take pre and post digital treatment photos of the target area/target specie(s).
- 5) Refer to Table 1. Brush Canopy Infestation (canopy chart) to determine canopy cover percentage based upon counted trees per acre based on the average tree canopy diameter.

As experience is gained in the use of this guidance, ocular estimates of canopy diameters and trees per acre would be acceptable. The method described in Range and Pasture Technical Note No. 17 “Field Inventory Procedure to Determine Brush Canopy Level or Density” is also acceptable. Frequent checking of ocular estimates is advised especially when working with unfamiliar trees species and if significant time has elapsed since the last time this technology was used.

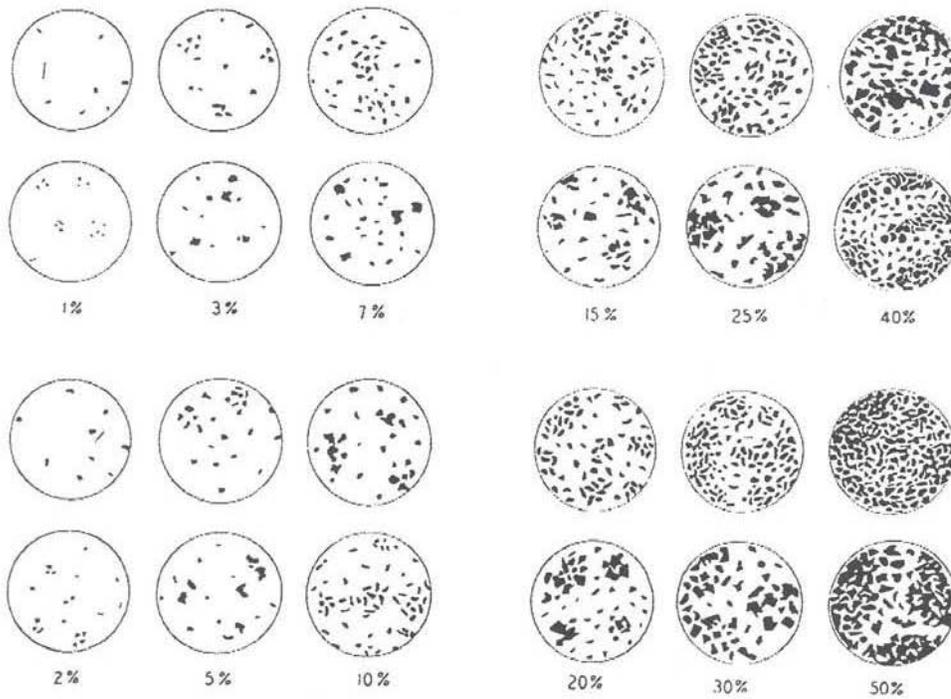
Table 1. Brush Canopy Infestation									
Tree Canopy (diameter in ft.)	Canopy								
	1%	5%	10%	15%	20%	25%	30%	40%	50%
2	139	694	1387	2081	2775	3468	4162	5549	6936
4	35	173	347	520	694	867	1040	1387	1734
6	15	77	154	231	308	385	462	617	771
8	9	43	87	130	173	217	260	347	434
10	6	28	55	83	111	139	166	222	277
12	4	19	39	58	77	96	116	154	193
14	3	14	28	42	57	71	85	113	142
16	2	11	22	33	43	54	65	87	108
18	2	9	17	26	34	43	51	69	86
20	1	7	14	21	28	35	42	55	69
22	1	6	11	17	23	29	34	46	57
24	1	5	10	14	19	24	29	39	48
26	1	4	8	12	16	21	25	33	41
28	1	4	7	11	14	18	21	28	35
30	1	3	6	9	12	15	18	25	31
32	1	3	5	8	11	14	16	22	27
34	0	2	5	7	10	12	14	19	24
36	0	2	4	6	9	11	13	17	21
38	0	2	4	6	8	10	12	15	19
40	0	2	3	5	7	9	10	14	17
42	0	2	3	5	6	8	9	13	16
44	0	1	3	4	6	7	9	11	14
46	0	1	3	4	5	7	8	10	13
48	0	1	2	4	5	6	7	10	12
50	0	1	2	3	4	6	7	9	11

Directions:

1. Determine the average canopy diameter of the trees or shrubs of concern.
 - a. Canopy is the area of ground covered by the vertical projection of the outmost perimeter of the natural spread of plant foliage.
 - b. A quick and easy way to do this is to measure the diameter of shaded circle on the ground below the tree or shrub in question at mid-day (assuming leaves are present).
2. After measuring the canopy diameter of several trees to get an average, refer to the first column in the chart and find the diameter value that is the same as the one you determined.
3. Follow the row across to the column value that most closely represents the number of trees per acre. The percentage at the top of that column is the percent canopy cover.
4. The value that is present is the number of trees that would need to be counted in an acre to be considered infested at that canopy percentage.

Example of foliage covers for quick review of aerial photos:

COMPARISON CHARTS FOR VISUAL ESTIMATION OF FOLIAGE COVER 1/



1/ Developed by Richard D. Terry and George V. Chilingar. Published by the Society of Economic Paleontologist and Mineralogist in its Journal of Sedimentary Petrology 25 (3): 229-234, September 1955.

OPTIONAL FORM 99 (7-10)